

**FINAL**

**First Five-Year Review Report**

**for**

**SCRDI – Bluff Road Superfund Site  
Richland County, South Carolina**

**PREPARED BY:**

**United States Army Corps of Engineers, Charleston District  
Charleston, South Carolina**

**FOR:**

**United States Environmental Protection Agency, Region IV  
Atlanta, Georgia**

**April 2003**

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## List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
AST	Above-ground storage tank
BGS	Below Ground Surface
BRA	Baseline Risk Assessment
BQL	Below Quantitation Limits
CATOX	Catalytic Oxidation
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
ERM	Environmental Resources Management
ESD	Explanation of Significant Difference
FS	Feasibility Study
GETS	Groundwater Extraction and Treatment System
GPM	Gallons Per Minute
GWCC	Ground Water Cleanup Criteria
HASP	Health and Safety Plan
MDL	Method Detection Limit
MCL	Maximum Contaminant Levels
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OUs	Operable Units
PLC	Programmable Logic Controller
PRP	Potentially Responsible Party
RA	Remedial Action
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SCDHEC	South Carolina Department of Health and Environmental Control
SCRDI	South Carolina Recycling and Disposal, Inc.
SVE	Soil Vapor Extraction
SVOCs	Semi-Volatile Organic Compounds
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOCs	Volatile Organic Compounds

## **Executive Summary**

The first five-year review of the South Carolina Recycling and Disposal, Inc. (SCRDI) Bluff Road Site in Columbia, Richland County, South Carolina was finalized in January 2003. The results of the five-year review indicate that the remedy is expected to be protective of human health and the environment. The soil remediation system was constructed, operated and functioned as designed, and decommissioned. Overall, the groundwater treatment system and remedial actions were functioning as designed, and are operated and maintained in an appropriate manner.

The protection of human health and the environment by the remedial actions at operable unit (OU) 01 are discussed below. Both Health and Safety and Contingency Plans are in place, sufficient to control risks, and properly implemented. Because the remedial action is currently protective of human health and the environment, the remedy for the site is expected to be protective of human health and the environment in the future.

### **Soil**

The remedy is protective of human health and the environment. Construction of the soil remedy was started and completed in 1994. The SVE soil remedy was implemented and performed in accordance with the Record of Decision (ROD) and the approved remedial design criteria and specifications. In late 1996, confirmatory vadose zone soil sampling verifies that the ROD specified target clean-up levels have been achieved and that all soil remedy actions specified in the ROD have been implemented. Site soils have been eliminated as a continuing source of contamination via leaching to the surficial aquifer and pose no threat to human health and the environment. The United States Environmental Protection Agency (USEPA) approved the soil remedy as complete in March 1997 and the system was removed from the site by early April 1997. The remedy is considered a permanent remedy, and no further action is required.

### **Groundwater**

The remedial action is currently protective of human health and the environment. The groundwater and extraction, treatment, and re-injection systems are operating and functioning as designed. Levels of contaminants are falling as needed to achieve cleanup levels within the time frame anticipated at the time of the ROD and Consent Decree (CD).

As of April 2002, based on the SCRDI-Bluff Road Monthly Progress Report, and as verified in this five-year review, the operation of the groundwater treatment system has continued within permit levels for air emissions and treated water quality for groundwater injection. Analytical results indicate the groundwater system is functioning satisfactorily. As of March 31, 2002, approximately 305 million gallons of groundwater have been recovered, treated and re-injected since system startup. Approximately 2900 pounds of volatile organic compounds (VOCs) have been effectively removed and treated within discharge limits.

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## Issues:

In the Closeout Report for the Soil Remediation, Section 9.0, it is stated that no five-year review is required specific to soils as no hazardous substances remain above the health-based levels in the designated zone area at the site. However, based on the first Explanation of Significant Differences (ESD) issued for the ROD, the USEPA does not exclude soil from five-year review scrutiny.

This is supported in the following statement: "A 5-year review is applicable for the site, because soil and groundwater will be contaminated above health-based risk levels until the remedy, projected to take two years from the ROD for contaminated soil remediation and 16 years for groundwater remediation, is fully implemented and deemed successful." Therefore brief discussions concerning soil contamination and remediation are presented throughout this review, although with not as much detail as the groundwater remediation effort.

Five-Year Review Summary Form			
Site Name: <b>SCRDI Bluff Road</b>		EPA ID: <b>SCD000622787</b>	
Region: <b>04</b>	State: <b>South Carolina</b>	City/County: <b>Richland County</b>	
LTRA* (highlight)	<b>Y</b>	<b>N</b>	Construction Completion Date: <b>10/96</b>
Fund/PRP Lead: <b>PRP</b>		NPL Status: <b>Final 09/08/83</b>	
Lead Agency: <b>EPA Region 4</b>			
Who conducted the review (EPA Region, state, Federal agencies or contractor): <b>US Army Corps of Engineers, Charleston District</b>			
Dates review conducted: <b>From 3/01 To:11/02</b>		Dates of site visit: <b>6/18/02, 11/14/02</b>	
Whether first or successive review: <b>First Review</b>			
Circle: Statutory <b>Policy</b>		Due Date: <b>December 2002</b>	
Trigger for this review (November 2002): Five years from construction start of SVE soil remediation. _____			
Recycling, reuse, redevelopment site (highlight):		<b>Y</b>	<b>N</b>

## Recommendations:

Further five-year review is not necessary for soil remediation following this initial review. Any statutory or policy five-year reviews for the SCRDI Bluff Road Site will be conducted based on status and conditions related to the groundwater remedy pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121(c) and OSWER Directives 9355.7-02 and 9355.7-02A.

**Protectiveness Statement(s):**

All elements of the remedy selected in the ROD and as amended in the ESDs for the SCRDI Bluff Road Site have been put in place, are functioning properly, and remain protective of human health and the environment.

**Other Comments:**

The local repository does not contain all documentation of activities that have taken place at the SCRDI-Bluff Road Site since the Soil Vapor Extraction (SVE) system design. It is recommended that all documentation relevant to the Site following the SVE system design be sent to the local repository. The repository is located at Richland County Public Library, Southeast Regional Branch, 7421 Garners Ferry Road, Columbia, South Carolina 29209.

Initially, the groundwater remediation system was designed for a flow rate of 240 gpm, and has operated generally at rates below 170 gpm. The EPA RPM has previously and as part of this five year review recommended that further investigation into how the groundwater extraction rate can be increased is necessary. Although the sixteen year operational period for the groundwater remedy is estimated, operation below the design capacity will serve to lengthen the operational period.

**Signature of EPA Regional Administrator or Division Director, and Date**

Signature

Date

Name and Title

**SCRDI Bluff Road Site  
Columbia, Richland County, South Carolina  
First Five-Year Review Report**

## **I. Introduction**

General. During June 2001 through January 2003, the U.S. Army Corps of Engineers, Charleston District (USACE), on behalf of the USEPA, Region 4, conducted a Five-Year Review of the remedy implemented at the SCRDI-Bluff Road Site, Richland County, South Carolina. This report documents the results of that review. The purpose of Five-Year Reviews is to determine whether the remedial actions at a site remain protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, any issues identified during the review will be presented, along with recommendations to address them.

Authority. This review is required by statute. Section 121 of the 1980 CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and Section 300.430 (f) (4) (ii) of the National Oil and Hazardous Substance Contingency Plan (NCP), require that periodic reviews be conducted at least every five years for sites where hazardous substances, pollutants or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure following the completion of all remedial actions.

This is the first Five-Year Review for the SCRDI-Bluff Road site. The trigger for this policy review is the passage of five years since the completion of construction and start of the groundwater extraction, treatment and injection system. The remedy for soil contamination has been constructed, completed and removed from the site. On-going actions at the site include operations and maintenance activities intended to maintain the integrity of the remedy, and long-term monitoring to evaluate the effectiveness of the remedy.

Local Repository. This review will be placed in the site files and local repository for the SCRDI-Bluff Road Site. The repository is located at Richland County Public Library, Southeast Regional Branch, 7421 Garners Ferry Road, Columbia, South Carolina 29209.

Note. Throughout this report, text has been extracted, summarized and/or edited from the following SCRDI-Bluff Road Site documents: USEPA ROD dated September 12, 1990; Remedial Investigation (RI) Report (1990); Feasibility Study (FS) Report (1990); Operations and Maintenance Plan (O&M) Documents (1996); Performance Standards Verification Plan (1996); Capture Zone Evaluation (1997); Southwest Area Investigation Report (1998); Reviews of Groundwater Recovery System Performance Reports (1997 – 2002); and monthly progress reports. Titles of documents reviewed for this report are presented in Attachment A.



## II. Site Chronology

**Table 1. Chronology of Site Events.**

<b>Event</b>	<b>Date</b>
Discovery	1 November 1979
Preliminary Assessment	1 December 1980
Federal Interagency Agreement	22 March 1982
Proposal to National Priorities List (NPL)	30 December 1982
Initial Remedial Measure	25 July 1983
Final Listing on NPL	8 September 1983
Consent Agreement	6 November 1983
Site Inspection	1 November 1984
Judicial/Civil Judgment	15 September 1986
Administrative Order on Consent	4 February 1988
Potentially Responsible Parties (PRP) Community Involvement	31 October 1988
SVE pilot test	July-August, 1990
PRP RI/FS	12 September 1990
Record of Decision Issued	12 September 1990
USEPA issued ESD	5 March 1992
Consent Decree (Civil Action No. 3.92-1108)	28 September 1992
Submittal of accelerated SVE system design	3 September 1993
USEPA conducts public meeting	16 May 1994
USEPA/SCDHEC approve SVE system design / issue ESD	22 June 1994
Construction of SVE system begins	11 July 1994
SVE operations begin	25 October 1994
Lodged by DOJ	28 April 1995
Vapor Phase Granular Activated Carbon units placed in operation for air treatment	19 October 1995
Remedial Design (RD) Amendment (ground water modeling)	8 November 1995
Submitted SVE yearly operations report to USEPA / SCDHEC	6 December 1995
SVE pulsed operations begin	20 December 1995
Submitted pulse test report USEPA / SCDHEC	22 February 1996
Preliminary soil borings completed	12-13, March 1996
Preliminary soil borings report submitted to USEPA / SCDHEC	19 April 1996
Public availability meeting at Hopkins Community Center with USEPA and SCDHEC	28 May 1996
Confirmatory soil borings completed	11-13 June 1996
Ground Water Pump and Treat System Operations Begin	8 August 1996
Submittal of SVE Remedial System Soil Closeout Report	23 August 1996
USEPA and SCDHEC approve SVE Closeout Report and concur the soil remedy actions are completed. Decommissioning plan for SVE system approved.	21 February 1997
Started SVE decommissioning activities	10 March 1997

Event	Date
Completed SVE decommissioning activities	21 March 1997
Submittal of SVE decommissioning report to USEPA / SCDHEC	24 April 1997
Capture Zone Evaluation Report	25 November 1997
Southwest Area Investigation Report	12 January 1998

### III. Background

#### A. Site Location and Description

##### Site Operations, Location Description, and Land Use

The SCRDI-Bluff Road Site is located in Richland County, South Carolina about ten miles south of the City of Columbia along State Highway 48, also known as Bluff Road (Figure B-1 through B-3, Attachment B). The site is rectangular parcel of land measuring 133 feet of frontage on Bluff Road and extends back approximately 1300 feet from the road. The site is relatively level with ground elevation varying from approximately 139 feet near the highway to 134 feet above mean sea level at the rear of the property. The front portion of the site extending approximately 600 feet from the road is cleared and has been used for various industrial and commercial purposes. The Bluff Road Site covers eight acres, four of which are a single rectangular parcel of land. The front half of the property is cleared, and used for various industrial and commercial purposes.

The site was operated by South Carolina Recycling and Disposal Inc. (SCRDI), as a waste storage, recycling, and disposal facility for waste chemicals from 1976 to 1982. An acetylene manufacturing facility was operated on the property prior to its use as a waste facility. The SCRDI Bluff Road Site was operated as a collection center for Columbia Organic Chemicals, and later SCRDI from 1975 to 1982 to store, recycle, and dispose of chemical wastes. The back half of the site is heavily wooded. The site is directly across Bluff Road from the entrance to the Westinghouse Nuclear Fuel Rod Plant. The site and nearby properties are rural and wooded. Property uses for adjacent properties to the site are for hunting and timber production, with the exception of the Westinghouse Plant. Any future use of the property would likely be light industrial development after the remediation is completed.

The site is located in a rural and remote area. The nearest residence lies one mile away. Approximately 3500 people live within four miles of the site. About 1200 people work immediately across the street from the site at a Westinghouse Nuclear Fuel Rod Manufacturing Facility. All residential wells closest to the site in the community of Hopkins were sampled by USEPA; data shows that site contaminants have not migrated to the residential wells. A large plume of contaminated groundwater extends southeast from the site. Additionally, sampling results have shown that contamination has not reached Myers Creek, located approximately 3200 feet from the site.

##### Soils, Wetlands, and Surface Water

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The soils identified in the project by the Richland County Soil Survey include loams, which are mixtures of sand, silt and clay. The specific soil types that exist at the site and vicinity are the Orangeburg loamy sand, Persanti fine sand loams, Smithboro loam, and Cantry loam. Most of the nearby property and rear portions of the site have been classified by the USACE as wetlands. Surface water flow from the SCRDI property and the adjacent study area is directed to one of two main drainage channels, a drainage ditch parallel to Bluff Road that is a tributary to Myers Creek, and Myers Creek itself. Groundwater flow is to the south-southeast. Two lagoons remain at the site and were utilized during the past operations.

### Local Hydrogeology

The stratigraphy of the study area can be summarized into four hydrologically connected water-bearing units. The hydrogeologic units are as follows:

- A shallow, surficial aquifer in the Okefenokee terrace, underlain by a clay or clay aquitard, part of the Black Creek Formation
- A deep aquifer consisting of sand and clay, also part of the Black Creek Formation, underlain by another aquitard and sandy clay
- The deepest aquifer, the Middendorf Formation, consisting of sand, silt, and clay (commonly referred to as the Tuscaloosa Aquifer)
- The crystalline pre-Mesozoic basement which has virtually no primary porosity but possibly has significant high secondary fracture porosity.

The shallow aquifer typically extends to a depth of 45 to 50 feet below ground surface (BGS) and is composed primarily of sand with varying amounts of silt and clay, and sorting ranges from well to poor. This aquifer is classified as a potable aquifer by the State of South Carolina. The shallow aquifer is semi-confined by a silt and clay layer that ranges in maximum depth of 5 to 15 feet BGS. The water table in the shallow aquifer general exists 10 to 15 feet BGS. The overall ground water flow is generally to the southeast.

The deep aquifer is separated from the shallow aquifer by a clay and silt unit, which ranges in thickness from 1.5 to 25 feet BGS. This partial confining unit is thinnest in the vicinity of MW-6 and MW-7 and thickens to the south and west (Figure B-3). The lithology of the deep aquifer is similar to that of the shallow aquifer, though clay-rich layers are more common. Both the clay aquitard and the deep aquifer are thought to be units in the Black Creek Formation.

The gradient of the shallow aquifer potentiometric surface is about 0.003 near Bluff Road and changes to less than 0.001 in the vicinity of MW-4, MW-6, MW-8, and MW-12 (Figure B-3). The Remedial Investigation data indicate that there is a downward head in the surficial aquifer and it could recharge the deeper aquifer. Flow patterns of the shallow aquifer water table are subject to local influences. The gradient of the

potentiometric surface in the deep aquifer is 0.0003 ft/ft toward the south based on water level data gathered from the four wells installed by the IT corporation.

## **B. Site Contaminant and Study History**

### **Initial Property Usage**

The first reported use of the site was as an acetylene gas manufacturing facility. Two lagoons were constructed at the north end of the cleared area of the site to support acetylene manufacturing. Specific dates and other details regarding the facility operations are not available. In 1975, the site became a marshalling center for the Columbia Organic Chemical Company. Site records indicate that the site's operator used the title, SCRDI beginning in 1976, as the site was intended to store, recycle, and dispose of chemical wastes from a variety of sources.

In March 1980, USEPA conducted a site visit and saw a number of leaking storage drums. Samples of the drums contents and adjacent surficial soils were collected and analyzed. The analyses showed the presence of volatile organic and other chemical compounds. An investigation of groundwater quality was performed by the SCDHEC in the Fall of 1980; results of the investigation indicated that groundwater had been impacted by the chemical releases; chlorinated organic solvents and lead were detected in the groundwater in 1980 and sampling of groundwater in 1982 indicated that concentrations of organic compounds in groundwater were increasing. Operations at the SCRDI Site were shut down in 1982.

### **Initial Site Cleanup**

Cleanup of the site surface was conducted in 1982 and 1983 under the direction of USEPA and SCDHEC. Over 7500 drums containing chemicals and numerous smaller containers of toxic, flammable, and reactive wastes were stored on the site from 1975 until it was closed in 1982; these containers were removed for proper disposal. Visibly contaminated soil and all above-ground structures were also removed and clean fill material was used to fill excavations and provide clean access road surfaces. In September 1983, the site was listed on the National Priorities List under the CERCLA.

Following a surficial cleanup in 1982 and 1983, groundwater and soil contamination remained at significant levels. Major soil contaminants included acetone, chloroform, 1,1,2,2-tetrachloroethane, toluene, chlorobenzene, and tetrachloroethane. Significant groundwater contaminants include acetone, 1,1-dichloroethane, toluene, 1,2-dichloroethene, aluminum, and iron. Major groundwater contaminants included volatile organic compounds and metals. A more detailed description of groundwater contamination is provided in following sections of this document.

### **Initial Remedial Investigation**

Remedial Investigation (RI) work was begun in 1984. In 1986, Golder Associates was retained by SCDHEC to conduct a RI to determine the type, extent, and degree of soil and groundwater contamination on and around the site. The investigation included soil

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and groundwater sampling, a soil gas survey, and a subsurface geophysical survey. The extent of groundwater contamination was investigated by installing 25 monitoring wells and 10 borings were drilled for organic vapor analysis. Assessment of contaminants in the above ground storage tank (AST), soil, lagoon water and groundwater samples indicated 2-chlorophenol and phenol in the AST, VOCs in vadose zone soils, both samples from the lagoon indicated that VOCs were not detected in concentrations that exceeded the method detection limit (MDL). Of the 25 monitoring wells, three of the monitoring wells, were screened in deep strata that underlie the black plastic clay. Water sample analyses from the three deep wells, installed below the clay aquitard, indicated that VOCs were not detected above the respective MDLs. The 22 wells installed in the surficial sand aquifer, indicated that chemical compounds were present throughout the thickness of the aquifer and were entirely VOCs, concentrations ranging from the MDL to 10328 µg/L.

### Final Remedial Investigation and Feasibility Study

In 1989, the RI was continued and involved the sampling of soil, surface water, sediments, ground water, and air. Sampling was conducted at the SCRDI site to define the characteristics and extent of contamination at the site. Nineteen monitoring wells were installed in the surficial aquifer to define the extent and characteristics of ground water contamination. The analytical results defined a contaminant plume approximately 1000 feet wide extending approximately 2200 feet southeast of the site.

Four monitoring wells were installed during the RI in the upper portion of the deep aquifer, below the clay aquitard. Analytical results of water extracted from these deep wells indicated that the deep aquifer had not been impacted by contamination.

Based on the analysis of forty-two surface soil samples collected during the RI, two general areas of surface soil contamination were identified (Figure B-5). The most significant area of surface soil contamination is found on the southwestern edge of the SCRDI site and encompassed approximately 350 feet x 200 feet (70,000 square feet). The second area of surface soil contamination was identified in the central portion of the SCRDI property (the dry lagoon area) at lower concentrations than those detected at the southwestern edge of the property. This second area encompassed approximately 100 feet x 100 feet (10,000 square feet).

Twenty-nine soil borings were sampled on and off the site to determine the extent of vadose zone contamination. Analytical results showed that elevated levels of VOCs were limited to the upper 7 feet of the unconsolidated zone with concentrations decreasing significantly with depth. The areas of detected elevated levels are limited to the proximity of B8 and B9 (approximately 300 feet ENE of B4 and B5). This encompassed an area of approximately 400 feet x 250 feet (112,500 square feet), which overlapped the area of high contaminant concentrations in surface soil. In addition SVOCs were detected in the same limited areas of B4/B5 and B8/B9; and low levels of pesticides/PCBs were detected in the subsurface soils in the B5, B8/B9 areas (Figure B-4).

The wet lagoon water and sediment samples contained trace amounts of VOCs and SVOCs. Sediment metal concentrations were within background ranges with the

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exception of calcium. Samples of off-site surface water and surface water sediment indicated no site related contamination. Ambient air samples were also collected at the site. Toluene was detected in two out of three bag samples at concentration of 22 and 27 ppb. No other constituents were detected; air contamination was determined not to be significant at the site.

The RI/FS was finalized in March of 1990, and indicated cleanup alternatives for remaining soil and groundwater contamination. In May 1990, USEPA issued a Proposed Plan for the cleanup of the SCRDI Bluff Road Site. The Proposed Plan recommended thermal desorption for the cleanup of contaminated soils remaining at the site, and extraction and treatment for contaminated groundwater. During the public comment period on the Proposed Plan, comments were received that supported a different alternative, SVE to clean up the soils. Under USEPA oversight, a pilot scale test of SVE was conducted at the SCRDI Bluff Road Site in July and August 1990. The pilot test demonstrated that SVE was a feasible remedial technology for this site and was capable of achieving the required target soil-cleanup levels in the vadose zone. Concerns that USEPA had about regarding the amount of clay in site soils and the effectiveness of SVE were satisfactorily addressed.

In addition to specifying SVE as the preferred alternative for treatment of the contaminated soils at the SCRDI-Bluff Road Site, the ROD specifies two options for the treatment of the extracted vapors. The ROD specifies that the extracted vapors will be run through a vapor/liquid separator and then finally treated either with vapor phase carbon adsorption, or by fume incineration.

### Record of Decision, Explanation of Significant Differences, and Consent Decree

A ROD was issued for the site by USEPA on September 12, 1990, which identified SVE as the recommended remedial alternative for soils and groundwater extraction and treatment as the recommended alternative for groundwater. Since the ROD was issued in September 1990, USEPA negotiated with over 100 PRPs that had operated, or had hazardous wastes transported and disposed at the SCRDI-Bluff Road Site. The result of the negotiations was a CD, a contractual agreement where PRPs agreed to pay site cleanup and EPA oversight costs. Litigation with adjacent property owners over the PRP's and USEPA's access to property surrounding the site caused significant delays (over two years) in beginning remediation of the site.

An Explanation of Significant Difference was issued in March of 1991. In the ROD, signed September 12, 1990, it was stated that a 5-year review would not apply to this site because "the remedy will not result in hazardous substances remaining on-site above health-based levels the five-year facility review will not apply...". However, according to the ESD issued in March 1991, the USEPA determined that a 5-year review was applicable for the site, because soil and groundwater will be contaminated above health based risk levels until the remedy, projected to take two years from the ROD for contaminated soil remediation and 16 years for groundwater remediation, until the remedy is fully implemented and deemed successful.

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The second ESD, issued June 22, 1994, marked the completion of the design for the soil remediation. The ESD was issued to describe the rationale for the change for the selection of a catalytic oxidizer (CATOX) unit over vapor phase carbon adsorption.

The implementation of the RD/RA is based on a Consent Decree (1992), agreed to by a group of potentially responsible parties, who are referred to as the Performing Settlers.

### Soil Remediation Established Clean-up Levels

In accordance with the ROD for SCRDI-Bluff Road Site, the chemical-specific soil target cleanup levels are presented in the following table. This table is equivalent to Table 14 of the ROD. The goals for VOCs are included in the following soil cleanup criteria table:

**Table 2. Soil Cleanup Criteria**

Parameter	Target Cleanup Level (mg/kg)	Parameter	Target Cleanup Level (mg/kg)
Carbon Tetrachloride	0.053	Chlorobenzene	0.956
Acetone	1.1 <sup>a</sup>	Tetrachloroethene	0.053
Chloroform	0.021	1,2-Dichloroethene	0.12
1,1,1-Trichloroethane	1.03	Total Xylenes	69.5
Methylene Chloride	0.017 <sup>a</sup>	Vinyl Chloride	0.003
1,1-Dichloroethane	0.006	1,1-Dichloroethene	0.013
2-Butanone	0.055 <sup>a</sup>	Benzene	0.012
Trichloroethene	0.018	1,2-Dichloroethane	0.005
1,1,2,2-Tetrachloroethane	0.001	2-Chlorophenol	0.55
Ethylbenzene	22.3	Phenol	3.95
4-Methyl-2-Pentanone	0.55 <sup>a</sup>	1,1,2-Trichloroethane	0.001
Toluene	17.4		

<sup>a</sup>Groundwater Target Cleanup Level

### Groundwater Established Clean-up Levels

As outline in Section 6 and Table 13 of the ROD, the groundwater remedial action is groundwater cleanup goals are based on Safe Drinking Water Act (SDWA) maximum contaminant levels (MCLs). The goals were based on USEPA maximum contaminant levels for drinking water or on risk-based criteria assuming groundwater use as a drinking water supply. Goals are established for 22 volatile organic compounds and 11 metals. The goals for VOCs are included in the following Groundwater Cleanup Criteria table:

**Table 3. Groundwater Cleanup Criteria**

<b>VOCs and SVOCs</b>	<b>Target Cleanup Level (µg/L)</b>	<b>VOCs and SVOCs</b>	<b>Target Cleanup Level (µg/L)</b>
Carbon Tetrachloride	5	Trichloroethene	5
Acetone	1100	1,1,2,2-Tetrachloroethane	0.6
Chloroform	20.9	Ethylbenzene	700
Benzene	5	1,2-Dichloroethane	5
1,1,1-Trichloroethane	200	4-Methyl-2-Pentanone	550
Methylene Chloride	17	Toluene	2000
1,1-Dichloroethane	5	Chlorobenzene	100
1,1-Dichloroethene	7	Tetrachloroethene	5
1,2-Dichloropropane	5	1,2-Dichloroethene	70
2-Butanone	550	Total Xylenes	10,000
1,1,2-Trichloroethane	2.2	2-Chlorophenol	55
<b>Metals</b>	<b>Target Cleanup Level (µg/L)</b>	<b>Metals</b>	<b>Target Cleanup Level (µg/L)</b>
Iron	300	Zinc	5000
Manganese	50	Lead	5
Barium	1000	Arsenic	50
Cadmium	5	Selenium	10
Chromium	50	Mercury	2
Copper	1000		

The most limiting of these goals are those for 1,1,2,2-tetrachloroethane (0.6 µg/L), carbon tetrachloride (5 µg/L) and tetrachloroethene (5 µg/L), in that the attainment of GWCC for these three VOCs defines the limit of the VOC plume. The ROD also includes Target Cleanup Levels for metals of concern. Dissolved metals analyses indicate that none of the metals exceed the Target Cleanup Levels except iron and manganese, which are naturally occurring according to background data.

#### Remedial Design Investigation

Environmental Resources Management, Inc. (ERM) performed a Remedial Design (RD) Investigation to collect the data necessary to design a groundwater remediation system for the SCRDI-Bluff Road Site and adjacent area (Figures B-6 through B-8). The results of the RD investigation indicated that:

- The groundwater in the surficial aquifer generally flows to the southeast from the Site towards Myers Creek (Figure B-7);
- The limit of the VOC plume extends approximately 2700 feet from the Site and 1200 feet southeast of the main access road (Figure B-7);



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- The analysis of total and dissolved metals results indicated that only three monitoring wells had concentrations that exceeded a Ground Water Cleanup Goal (GWCG) and significantly exceeded background quality for a metal (all manganese or iron, which are secondary standards for taste and odor);
- There is no data to indicate that the aquitard is absent from any portion of the site or adjacent area;
- A T-shaped design consisting of recovery wells along the plume and re-injection wells up-gradient of the capture zone was selected;
- Additional monitoring wells were recommended to be installed down-gradient of the recovery wells to verify the plume limits and provide sentinel wells for monitoring during recovery and treatment efforts;
- Solute transport modeling demonstrated that the elapsed time for down-gradient cleanup be achieved might be as short as ten years, assuming no continuing source of VOCs;
- The air stripper and activated carbon treatment of organic compounds is predicted to result in discharge of effluent below maximum contaminant level concentrations, and thus will not degrade groundwater quality when re-injected into the surficial aquifer. Metals concentrations are likewise expected to be less than the GWCG or background concentrations.

## IV. Remedial Actions

### A. Remedy Selection

A complete detailed description of the remedy is contained in the O&M Documents (refer to Attachment A for documents reviewed). The major components of the selected remedy for the site include:

1. Soil Vapor Extraction
  - Installation of a network of air withdrawal (or vacuum) wells in the unsaturated zone; and
  - Construction of a pump and manifold system of PVC pipes used for applying vacuum on the air wells to remove the organic compounds from soil.
2. Groundwater (Pump and Treat)
  - Extraction of contaminated groundwater;
  - On-site treatment extracted groundwater via:
    - Pretreatment for metals removal
    - Air-stripping;
    - Liquid phase granular activated carbon system;

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- Vapor phase activated carbon system (emission control);
- Discharge of treated groundwater via re-injection; and
- Groundwater remediation will be performed until all contaminated water meets the cleanup goals.

### Soil Remedy Selection

On September 3, 1993, in accordance with requirements of the Consent Decree, the PRP submitted a draft design for the SVE system, for which both USEPA and SCDHEC reviewed and issued comments. Of the two options identified in the ROD for SVE vapor treatment, the draft design and its revisions selected fume incineration, specifically, a catalytic oxidizer, or CATOX unit. The pilot test demonstrated that SVE was a feasible remedial technology for this site and was capable of achieving the required target soil-cleanup levels in the vadose zone. Concerns that USEPA had regarding the amount of clay in site soils and the effectiveness of SVE were satisfactorily addressed.

### Groundwater Remedy Selection

Currently, the purpose of remedial action at the SCRDI-Bluff Road Site is to mitigate and minimize contamination in groundwater, and to reduce potential risks to human health and the environment. The following clean-up objectives were determined based on regulatory requirements and levels of contamination found at the Site; these goals of system operation are outlined in Section 1.4 of the O&M Plan:

- Capture groundwater to contain the Site VOC plume down-gradient to MW-21B and the southwest plume to Bluff Road;
- Treat groundwater to meet the discharge limits established by SCDHEC in the Underground Injection Control Permit;
- Attain the Groundwater Cleanup Criteria established in the ROD; and
- Operate the system in a manner that is efficient, safe and protective of human health and the environment;
- To prevent off-site movement of contaminated groundwater;
- To restore contaminated groundwater to levels protective of human health and the environment;
- Treating Air emissions from volatilization as needed to meet ambient air quality standards;
- Recovery of groundwater through a collection system consisting of eight groundwater recovery wells;

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- Treatment of groundwater by air stripping of VOCs, pumping through a duplex basket filter to remove suspended solids, by polishing with granular activated carbon;
- the injection of the groundwater to the aquifer in a series of 10 wells, which are located upstream of the contaminant plume in a northwesterly direction from the treatment plant; and
- Monitoring groundwater and air onsite.

### **B. Remedy Implementation**

#### **Soil Remedy Implementation**

Construction of the soil remedy was started and completed in 1994. The soil cleanup goals were reached in late 1996. USEPA approved the soil remedy as complete in March 1997 and the system was removed from the site by early April 1997.

The SVE soil remedy was implemented and performed in accordance with the ROD and the approved remedial design criteria and specifications. Confirmatory vadose zone soil sampling verified that the ROD specified target cleanup levels have been achieved and that all soil remedy actions specified in the ROD have been implemented. Site soils have been eliminated as a continuing source of contamination via leaching to the surficial aquifer and pose no threat to human health and the environment.

The total post-ROD cost for the soils remediation effort was \$1,770,000. This was the cost associated with the work by the SVE system contractor (Terra Vac, Inc). Refer to Table 1 of this report for the time line of soil remediation and SVE system operations. Refer to the SCRDI Bluff Road Site SVE Remedial System Soil Closeout Report for more details concerning: SVE remedial system performance criteria; SVE system installation and construction activities; SVE systems operations and maintenance; pre- and post-operations confirmatory sampling results; clean-up goal verification; cessation of SVE system operations; SVE well abandonment; and manifold dismantling and disposal.

#### **Groundwater Remedy Implementation**

The ground water recovery system at the Site was constructed in 1996 and operation began in August 1996. Refer to Attachment D for photographs of treatment system instrumentation, equipment, etc. The system consists of eight ground water recovery wells (RW-1 to RW-8) and ten injection wells (IW-1 to IW-10) (Figure B-10). All wells were installed in the shallow, unconfined, alluvial aquifer system. As of November 1997, as presented in the Capture Zone Evaluation Report, the total pumping rate of the system was rated at 130 to 160 gallons per minute (gpm). All of the extracted groundwater is treated by air stripping and carbon polishing, and then recharged to the shallow aquifer via the ten injection wells.

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Figures B-9 and B-10 present the locations of the recovery wells, injection wells, and a delineation of the VOC plumes developed from August 1996 or earlier data. As outlined in the Capture Zone Evaluation Report, the plumes can be described in terms of a northern plume lobe or section and the southern plume section. The distinction between these plume sections is defined by the change in ground water flow direction just south of RW-5 and is not related to a change in the chemical nature of the plume.

Recovery wells RW-1 through RW-5 are located along the axis of the northern plume (Figures B-9 and B-10). Recovery wells RW-6 through RW-8 are located along Bluff Road at the southwest limit of the Site Access Area. These three wells were designed to perform as a picket line for hydraulic capture. Wells RW-6 and RW-7, by themselves could contain the limits of both the northern and southern plume sections, based on the balance between pumping rate and amount of ground water flowing naturally in this area.

The well pumps are submersible, centrifugal type located in the wells. The total *planned* startup recovery/injection pumping rates, as outline in the O&M Manual was 160 gallons per minute. The well pumps transfer the groundwater from the wells through a duplex basket filter into a 9100-gallon influent equalization tank. From the equalization tank, a horizontal centrifugal pump transfers the water to two air strippers, in parallel, for removal of the bulk of VOCs. Effluent from the air strippers is transferred via a progressive cavity pump through a duplex basket filter and two granular activated carbon vessels, in series. The carbon vessel effluent, fully treated, is discharged into the injection system.

The entire treatment system is housed inside a prefabricated metal building located approximately 400 feet from Bluff Road. A sump is cast into the floor of the building with an approximate working volume of 200 gallons and a permanent sump pump is in place. The sump pump discharges to the influent equalization tank. An electrical distribution panel and programmable logic controller (PLC) and alarm system are in the building.

### **C. System Operations / O&M**

The groundwater recovery, injection and treatment systems installed at the site are capable of operating for extended periods of time without extensive human attention. As outlined in the O&M Plan, these systems are designed to include full automation, shutoff controls, telemetry and PLC to allow for unattended operation. Built into the system are interlocks and safety devices that will shut down the system to prevent an accidental release and prevent damage to the equipment while operating unattended. The instruments include level control to start and stop pumps, throttling valves to set system flow rate; flow measurement and recording; flow and pressure detection to detect upset conditions, and pressure relief devices in the event of upset conditions.

#### **Permits**

The SCDHEC issued a permit (No. 17, 908-IW) for the construction of the site groundwater treatment system on 7 December 1995. According to the permit, the facility

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is classified in Group I-PC, requiring the operation of the system of a Grade D Operator. The construction permit also provided for the submission of a Best Management Practices Plan to avoid and mitigate the release of toxic or hazardous substances as defined in Parts 117 and 122 of 40 Code of Federal Regulations (CFR).

The SCDHEC approved the operation of 10 Class VA-I (aquifer remediation) injection wells at the referenced site as per their inspection of April 15, 1996, Injection Well Operating Permit #149M. It is required by the permit that wells be operated in accordance with Supplemental Groundwater Sampling Report of April 19, 1995, the draft O&M manual submitted on February 29, 1996 and May 24, 1996 correspondence of de maximis, inc., and SCDHEC representatives.

The proposed injection and discharge limits for the re-injection wells for VOCs and semi-volatile (SVOCs) are as follows:

**Table 4. Treated Water Injection and Discharge Limits.**

Compound	Injection Well Discharge Limit (µg/L)
<b>VOCs</b>	
Carbon Tetrachloride	5
Acetone	1100
Chloroform	21
Benzene	5
1,1,1-Trichloroethane	200
Methylene Chloride	17
1,1-Dichloroethane	5
1,1-Dichloroethene	7
1,2-Dichloropropane	5
2-Butanone	550
1,1,2-Trichloroethane	2
Trichloroethane	5
1,1,2,2-Tetrachloroethane	0.6
Ethylbenzene	700
1,2-Dichloroethane	5
4-Methyl-2-Propane	550
Toluene	2000
Chlorobenzene	100
Tetrachloroethane	5
1,2-Dichloroethene	70
Total Xylenes	10000
<b>SVOCs</b>	
2-chlorophenol	55

An air construction permit (99000198-CC) was issued by SCDHEC on 20 September 1995 for the installation of the air strippers. The permit incorporates all provisions of the

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SCDHEC Regulation 61-62.1, Section II, paragraph C and places limits on emissions for capacity and air toxics. The permit requires no continuous monitoring. Air discharge limits are presented in Table 5, which is presented in the following:

**Table 5. Air Discharge Limits**

Parameter	Discharge Limit	
	(lb / hour)	(tons / yr)
Carbon Tetrachloride	0.03	0.131
Chloroform	0.261	1.143
Methylene Chloride	0.083	0.364
Ethylidene Dichloride	0.125	0.548
Methyl Ethyl Ketone	0.083	0.364
Trichloroethene	0.042	0.183
1,1,2,2-Tetrachloroethane	0.083	0.364
Ethylbenzene	0.042	0.183
Methyl Isobutyl Ketone	0.042	0.184
Toluene	0.114	0.499
Chlorobenzene	0.021	0.092
Tetrachloroethene	0.083	0.364
Xylene	0.042	0.184
Vinyl Chloride	0.038	0.166
Vinylidene Chloride	0.057	0.25
Benzene	0.03	0.131
Ethylene Dichloride	0.053	0.232
1,1,2-Trichloroethane	0.055	0.241
Phenol	0.016	0.07
Carbon Disulfide	8.33E-05	3.65E-04
Hydrochloric Acid	1	4.38

An air operating permit was issued on 24 April 1996 by SCDHEC for the air discharge from the air strippers. The permit requires the operator to maintain a file of operational activities each month, including a description of work completed in the previous reporting period and anticipated work in the upcoming period, corrective actions taken and modification of system operation and schedule.

### Personnel

The groundwater treatment system permit classifies the facility in Group I-PC, requiring the operation of the system by a Grade D certified operator. As required by the permit, a certified wastewater treatment system operator staffs the system and has the ability to perform the needed operational tasks required by the system and is certified in accordance with CFR 1910.120 for hazardous waste personnel. The staff is on call 24 hours per day, 7 days a week to respond to any emergencies.

### Site Access and Site Control

The main gate controls access. Only personnel listed on the approved site access list are allowed entry without being escorted by a de maximis, inc. or O&M, inc representative. The building is locked when unoccupied. The building is only unlocked and opened during routine inspections, sampling events or ongoing maintenance. All personnel entering the site are required to report to the office and fill out the site entry log. In addition, personnel performing work on site are required to participate in a brief safety meeting, and review the approved Site Health and Safety Plan.

The building is provided with a security system to monitor for burglar entry and fire. A trouble alarm from any point on the security system will cause an alarm, which will activate the interlocks and the autodialer will alert an operator. Security personnel at the Westinghouse Nuclear Fuel Rod Manufacturing Facility provide unscheduled, additional security along external portions of the Site property during their routine perimeter inspections.

### Inspection Procedures

Inspection procedures have been put in place to insure uninterrupted operation of the groundwater recovery, treatment and injection system. An equipment record system has been put in place to assist personnel in managing inspection and maintenance schedules. Inspections are conducted on a weekly basis to monitor the operation and condition of the recovery, treatment, and injection system components. Equipment numbering system and on-site maintenance of equipment records has also been put in place. Inspection checklists are provided in Appendix C of the O&M Manual. The following inspections and monitoring schedules are some of the requirements outlined in the O&M Manual:

#### 1. Groundwater Collection and Injection System

- Pumping flow rates monitored on a weekly basis and reported quarterly;
- Injection flow rates monitored on a weekly basis and reported quarterly;
- Monitoring well levels monitored per sampling plan frequency and reported quarterly;
- Extraction Well levels monitored on a monthly basis and reported quarterly;
- Injection well levels and pressure monitored on a monthly basis and reported quarterly;
- Conveyance system leaks monitored on a weekly basis and reported quarterly;
- Extraction well efficiency evaluated on a quarterly basis and reported annually;
- Injection well efficiency evaluated on a quarterly basis and reported annually; and
- Groundwater levels evaluated on a quarterly basis and reported annually.

## 2. Groundwater Treatment System

- Filter bags are examined in each filter each time the operator visits the treatment system;
- Check air pressure on discharge of blowers;
- Blowers inspected for signs of excess noise, vibration, seal or gasket leaks, or other signs of deterioration;
- The operator required to check the equalization line between the air stripper sumps is open and working properly;
- The operator required to check the air stripper for fouling due to mineral precipitation;
- The air stripper Installation, Operation and Maintenance manual provides complete instructions for cleaning of the air strippers;
- Check carbon piping valves on carbon units are in correct position for the current configurations;
- Pressures should be checked and recorded;
- Pumps in the treatment buildings should be inspected with every operator visit;
- Pumps should be checked for discharge pressure, signs of excess noise, vibration, seal or gasket leaks, lubrication leaks or other signs of deterioration;
- All pumps require quarterly maintenance.

### General Cleaning, Housekeeping, and Storage

Housekeeping duties outlined in the O&M Manual required general yard work, road maintenance work, field maintenance, general cleaning, and janitorial duties. It also requires that housekeeping equipment and supplies should be stored in safe and permanent storage areas.

### Troubleshooting

Refer to the manufacturer literature for guidance on trouble shooting. A troubleshooting guide is included for each piece of equipment installed at the site. If a piece of equipment continues to malfunction and causes the remediation system to become unreliable, a manufacturer's representative should be contacted for a service call or to obtain a replacement.

### Failure Analysis and Shutdown Procedure

Detailed failure analysis and shutdown procedures are provided in the O & M manual.

### Annual O&M Costs

The projected annual O&M costs for air-stripping remediation of groundwater was \$306,875 in the 1990 FS report. Actual annual O & M costs as of June 2002 for the operation and maintenance of the groundwater pump and treat system at the Bluff Road Site are listed below in Table 6 for comparison to the FS projection.



**Table 6. Annual O&M Costs as of April 2002**

<b>Year</b>	<b>O&amp;M Costs</b>
Sept-Dec 1996	\$55,258
1997	\$176,780
1998	\$149,419
1999	\$168,973
2000	\$158,005
2001	\$176,341
Jan-Apr 2002	\$53,980

#### **D. Progress Since Commissioning**

The groundwater remedial system construction is complete and startup occurred in August 1996. The system for extraction, treatment and injection of groundwater is anticipated to operate for 16 years. As of April 2002, based on the SCRDI-Bluff Road Monthly Progress Report, and as verified in this five-year review, the operation of the groundwater treatment system has continued within permit levels for air emissions and treated water quality for groundwater injection. Analytical results indicate the groundwater system is functioning satisfactorily. As of March 31, 2002, approximately 305 million gallons of groundwater have been recovered, treated and re-injected since system startup. Approximately 2900 pounds of VOCs have been effectively removed and treated within discharge limits.

Additional analytical data obtained in the November 2002 are presented in Attachment C of this document. Discussion of these data are presented in Section VI, under Part D, "Data Review".

#### **V. Five-Year Review Process**

The Bluff Road SCRDI site Five-year Review was conducted by USACE, Charleston District for USEPA, Region IV. The Remedial Project Manager for the site is Steven Sandler. The following team member(s) from the Corps assisted in the review:

- Mitch Hall, P.G.
- Ken See, P.E.

The Five-year Review consisted of the following activities: a review of relevant documents at the site and at the local repository (Attachment A); interviews with site personnel; and a site inspection. The final report will be available in the information repository at the Richland County Library.

## **VI. Five-Year Review Findings**

### **A. Interviews**

The following individuals were contacted by phone or personally as part of the five-year review:

#### **EPA Region IV Remedial Project Manager, Mr. Steven Sandler**

Mr. Sandler was contacted during the initial planning phase for this Five-Year Review and provided background information on the SCRDI-Bluff Road Site and a list of potential contacts having knowledge of site activities to the Corps of Engineers Project Manager. Also, Mr. Sandler provided review comments on the five-year review report and modified the COE January 2003 submittal to add additional information and improve readability,.

#### **de maximis, inc., Environmental Project Management, Mr. John P. Stiles**

Mr. Stiles contacted by phone on several occasions, and he also attended both site visits on 18 June and 14 November 2002. Mr. Stiles accompanied the site inspection team during Site walkovers and answered questions concerning contaminants of concern, optimization of remediation efforts, Site study history, and was readily forthcoming with all pertinent documentation needed for the five-year review process.

#### **O & M, Inc., Dan Garrigan and Scott Ingles**

Mr. Garrigan and Mr. Ingles attended both site visits on 18 June and 14 November 2002. Both were very knowledgeable of remediation action system functions and operations and maintenance schedules. Both provided overviews on equipment operations, functionality and problems encountered.

#### **U. S. Army Corps of Engineers HTRW-CX, Ms. Sandy Frye**

Sandy Frye conducted the ARARs compliance review for this report. Mitch Hall provided copies of all analytical data, the ROD, ESDs, CD, and other pertinent information to her for ARARs compliance reviews.

### **B. Site Visit and Inspection**

Two site visits were conducted for the five-year review at the SCRDI -Bluff Road Site. The initial site visit, conducted on 18 June by Dante Alguto and Mitch Hall (See Attachment D), was conducted solely for the purpose of becoming familiar with the Site and beginning the document collection process for purpose of review. Ken See and Mitch Hall conducted the second Site visit on 14 November 2002. The purpose of the visit was to conduct a site inspection, to help Ken See, who replaced Dante Alguto on the team, become familiar with the Site, and to ask any additional questions raised during the document, data and ARARs review process. The observations made during the site visit are presented herein.

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The inspection evaluated site access and control, knowledge of pertinent on-site documentation of Operations and Maintenance and Health and Safety, and the groundwater treatment system.

The permits and O&M manuals require the operator to maintain a file of operational activities each month, including a description of work completed in the previous reporting period and anticipated work in the upcoming period, corrective actions taken and modification of system operation and schedule. These were on-site and maintained in good order. John Stiles was also very helpful in providing any reports, data and other pertinent information as needed for this five-year review.

Weekly inspection checklists were reviewed. The checklist was filled out on 12 November 2002 and included: recovery and injection pump flow rates; pressure readings; influent equalization tank levels; stripper feed pump discharge pressure; flow to air strippers; blower no.1 and no.2 discharge pressures, air stripper no. 1 and no.2 alarm status; transfer pump discharge pressure; pressure across duplex filter no. 1 and no. 2; carbon unit no.1 and no.2 pressure; header pressure; sump levels; stripper feed pump lubricant levels; filter bag change status; status of injection and recovery wells (i.e., locks, leaks, mounding, vandalism; and signs of pipeline leakage. All line items were filled out sufficiently. A copy of the weekly inspection list is provided in Attachment E.

Record of maintenance of groundwater recovery, treatment and injection systems were on-site and in place. All site visitors were required to sign the Site log-in sheet. A detailed tour of groundwater remediation system (refer to Attachment F) was given by on-site personnel including:

- The functionality of the “pigging” system including pigging access points and receiving tank;
- The functionality of the groundwater recovery system (i.e. recovery wells, pump descriptions, piping);
- The operation and maintenance, and functionality of the groundwater treatment system and overall treatment facility including but not limited to the influent header, bag filters, TK-1 total inflow tank, pumps, injection header, sampling points, the PLC system, extraction well control panel, air strippers, work area upkeep, etc.;
- The functionality of the treated water injection system (i.e. injection wells, pump descriptions, piping);
- Water sample collection stations for contaminant concentration monitoring; and
- Discussion on the 24-hour, 7-days a week staff availability at the site.

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Housekeeping duties outlined in the O&M Manual required general yard work, road maintenance work, field maintenance, general cleaning, and janitorial duties. It also requires that equipment and supplies should be stored in safe and permanent storage areas. It was apparent during both site visits that good site management practices are being fully implemented. It was also apparent during the site visit that well casing locks and site fencing were in place and functional.

### **C. ARAR Compliance Review**

An Applicable or Relevant and Appropriate Requirements (ARARs) review was performed for the site in accordance with the draft USEPA guidance document, "Comprehensive Five-Year Review Guidance," USEPA 540R-98-0850, October 1999.

#### **Changes in Standards and ARAR Compliance Review**

As the remedial action goals for the soil cleanup portion of the remedy have been achieved, there are no ARARs requiring review for the soil remediation. There were no chemical-specific ARARs identified in the ROD for the soil cleanup, and it is assumed that all action- and location-specific ARARs were complied with during soil remediation activities. Therefore, only ARARs associated with the groundwater cleanup portion of the remedy have been evaluated in this five-year review.

ARARs identified in the 1990 ROD for the groundwater remedy that affect the protectiveness of the remedy include:

1. 40 CFR 144 – Federal standards and criteria for injection of the treated groundwater
2. 40 CFR 147 – Federal requirements to comply with State underground injection control regulations.
3. South Carolina Underground Injection Regulations

While SDWA MCLs were not specifically identified in the ROD as ARARs, Table 13 of the ROD indicate that MCLs were used as the basis for establishing cleanup levels. As such, the following table provides a comparison of 1990 MCLs to current MCL standards with changes in the standards highlighted in the following table.

**Table 7. Changes in Chemical-Specific (MCL) Standards for Organic Contaminants.**

<b>Changes in MCL Standards for Organic Contaminants for the SCRDI Bluff Road Superfund Site</b>				
<b>Contaminant</b>	<b>Media<sup>1</sup></b>	<b>Cleanup Level<sup>2</sup></b>	<b>Standard</b>	
Carbon Tetrachloride	GW	5	Previous	5
			New	5
Benzene	GW	5	Previous	5
			New	5
1,1,1-Trichloroethane	GW	200	Previous	200
			New	200

Changes in MCL Standards for Organic Contaminants for the SCRDI Bluff Road Superfund Site				
Contaminant	Media <sup>1</sup>	Cleanup Level <sup>2</sup>	Standard	
1,1-Dichloroethane	GW	5	Previous	5
			New	None
1,1-Dichloroethene	GW	7	Previous	7
			New	7
1,2-Dichloropropane	GW	5	Previous	5
			New	5
Trichloroethene	GW	5	Previous	5
			New	5
Ethylbenzene	GW	700	Previous	700
			New	700
1,2-Dichloroethane	GW	5	Previous	5
			New	5
Toluene	GW	2000	Previous	2000
			New	1000
Chlorobenzene	GW	100	Previous	100
			New	100
Tetrachloroethene	GW	5	Previous	5
			New	5
1,2-Dichloroethene	GW	70	Previous	70
			New	70
Total Xylenes	GW	10,000	Previous	10,000
			New	10,000

1 – S = soil, GW = groundwater, SW = surface water, SED = sediment and A=air.

2 – Cleanup levels listed are those found in Table 13 of the 1990 ROD. Units are in parts per billion (ppb).

The only changes to groundwater MCL standards were for 1,1-Dichloroethane and toluene. There currently is no MCL for 1,1-Dichloroethane whereas the 1990 ROD listed an MCL of 5 ppb. The MCL for toluene is now 1000 ppb versus the 2000 ppb listed in the 1990 ROD. While the toluene MCL has decreased, toluene levels in groundwater at the site are well below the current standard and no changes to the remedy or operating system are required to meet the new MCL for toluene.

The action-specific ARARs for the underground injection system are being met via the conditions in the existing South Carolina Groundwater Protection Division Injection Well Operating Permit #149M (issued 16 April 1996). As long as the permit conditions are complied with, the underground injection well system should be considered protective of human health and the environment.

#### **D. Data Review**

The performance of the system was evaluated after system startup in the June and November 1996 based on the evaluation of the groundwater potentiometric surface, change in gradient, and flow directions. The evaluation of capture at startup concluded that groundwater recovery was effective in containing the VOC plume. It was also concluded that the system was containing the plume at a pumping rate of 130 to 140 gpm;

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recovery effectiveness was due to adequate pumping from RW-6, RW-7, and RW-8; and reduction in pumping in RW-1 through RW-5 was noted.

According to the Remedial Action Report several modifications to the system were implemented to address field conditions. One of the modifications included the shut down of RW-3 due to excessive iron levels, at concentrations as much as 40,000ug/L. ERM conducted a Capture Zone Evaluation Report in 25 November 1997. The purpose of the report was to present an evaluation of the groundwater recovery system performance with respect to the capture of the defined Site VOC plume. This report concluded that VOC capture was still taking place at a sufficient rate.

Groundwater quality data were also evaluated in the Capture Zone Evaluation Report. It was concluded in this evaluation that VOC levels were demonstrating a decreasing trend in concentrations in wells MW-2A, MW-13B, MW-17B, MW-18B, and MW-21B; and that wells MW-16B, MW-22B, and RW-6 were demonstrating an increase in VOC concentrations. In addition, it was noted that VOCs in wells MW-19B and MW-20B were below quantitation limits and VOC concentrations in MW-17B, MW-18B, and MW-21B were below cleanup criteria.

The purpose of the Southwest Area Investigations Report submitted in January 1998 was to verify the extent of plume capture near and in the vicinity of RW-8, and assess VOC impacts on the southwest side of Bluff Road. The following are some of the conclusions that were made:

- The VOC plume is present on the southwest side of Bluff Road at TP-4;
- Groundwater velocities are high enough that the VOC plume may have already reached Mill Creek;
- The southern extent of the VOC plume is less than 100 feet south of RW-8. The groundwater at temporary piezometers in the area of RW-8 meets Site cleanup criteria for VOCs;
- Pumping at RW-6 and RW-7 contains the plume, thereby cutting off the source of contaminants to the southwest side of the road and ultimately Mill Creek;
- Based on mass balance calculations, it was demonstrated that without the current implementation of the groundwater treatment system, hypothetical discharge of the VOC plume to Mill Creek would not adversely impact the surface water quality (i.e., VOC concentrations would not exceed Federal and State drinking water standards);
- No groundwater receptors have been identified for the portion of the VOC plume that has already migrated beyond Bluff Road; and

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- Restoration of groundwater quality southwest of Bluff Road should occur in the same time frame as the groundwater plume on the northeast side of Bluff Road.

As of April 2002, based on the SCRDI-Bluff Road Monthly Progress Report, and as verified in this five-year review, the operation of the groundwater treatment system has continued within permit levels for air emissions and treated water quality for groundwater injection. Analytical results indicate the groundwater system is functioning satisfactorily. As of March 31, 2002, approximately 305 million gallons of groundwater have been recovered, treated and re-injected since system startup. Approximately 2900 pounds of VOCs have been effectively removed and treated within discharge limits.

According to the Review of Ground Water Recovery System Performance of the SCRDI-Bluff Road Site, submitted in September 2002, the following conclusions and recommendations were made: —

- The operation of GWRS has resulted in the improvement of groundwater quality at the site. VOC levels in many of the monitoring and recovery wells have declined by as much as a factor of 10;
- VOC levels in monitoring wells MW-10B, MW-12B, and MW-24B have increased since the startup of the groundwater remediation system. However the contaminant concentration levels are still well below the highest plume concentrations and the increase can be attributed to the shifting of the VOC plume in response to pumping;
- Temporary piezometers TP-03 and TP-04 continue to provide valuable information concerning the VOC plume and performance of the remediation system. It was recommended that TP-01 and TP-02 be abandoned.

A review of records and monitoring reports through November 2002 (Attachment C) indicates that since the initiation of groundwater extraction, total VOC concentrations have decreased. The operation of the groundwater treatment system has continued within permit levels for air emissions and treated water quality for groundwater injection. Analytical results indicate the groundwater system is functioning satisfactorily.

## VII. Assessment

The following conclusions support the determination that the remedy implemented at the SCRDI-Bluff Road Site is protective of human health and the environment.

### Question A: Is the remedy functioning as intended by the decision documents?

- **Record of Decision:** Construction of the soil remedy was started and completed in 1994. The soil cleanup goals were reached in late 1996. USEPA approved the soil remedy as complete in March 1997 and the system was removed from the site by early April 1997. The groundwater remedial system construction is complete and startup occurred in August 1996. The system for extraction, treatment and

injection of groundwater is anticipated to operate for 16 years. As of April 2002, based on the SCRDI-Bluff Road Monthly Progress Report, and as verified in this five-year review, the operation of the groundwater treatment system has continued within permit levels for air emissions and treated water quality for groundwater injection. Analytical results indicate the groundwater system is functioning satisfactorily.

- **HASP/Contingency Plan:** Both the HASP and the Contingency Plan are in place, sufficient to control risks, and properly implemented.
- **Implementation of Institutional Controls and Other Measures:** Institutional Controls are in place and are properly implemented.
- **Remedial Action Performance:** Construction of the soil remedy was started and completed in 1994. The soil cleanup goals were reached in late 1996. USEPA approved the soil remedy as complete in March 1997 and the system was removed from the site by early April 1997. The groundwater remedial system construction is complete and startup occurred in August 1996. The system for extraction, treatment and injection of groundwater is anticipated to operate for 16 years. As of April 2002, based on the SCRDI-Bluff Road Monthly Progress Report, and as verified in this five-year review, the operation of the groundwater treatment system has continued within permit levels for air emissions and treated water quality for groundwater injection. Analytical results indicate the groundwater system is functioning satisfactorily.

Southwest Area Investigations Report submitted in January 1998 to verify the extent of plume capture near and in the vicinity of RW-8, and assess VOC impacts on the southwest side of Bluff Road. It is concluded in this report that although: (1) the VOC plume is present on the southwest side of Bluff Road at TP-4; and (2) groundwater velocities are high enough that the VOC plume may have already reached Mill Creek; the groundwater at temporary piezometers in the area of RW-8 meets Site cleanup criteria for VOCs, and pumping at RW-6 and RW-7 contains the plume, thereby cutting off the source of contaminants to the southwest side of the road and ultimately Mill Creek.

- **System Operations/O&M:** The implemented system has been operated and maintained according to O&M Manual specifications, with the exception of recovery well RW-3. RW-3 is offline due to excessive iron content. The total *planned* startup recovery/injection pumping rates, as outline in the Operations and Maintenance Manual was 160 gallons per minute. Although the pumping rate is lower than originally expected (130 to 140 gpm); it can be concluded that the system is containing the plume; removing contaminants and injecting water below injection standards.



## FINAL

- **Cost of System Operations/ O&M:** Actual annual O&M costs as of June 2002 for the operation and maintenance of the groundwater pump and treat system at the Bluff Road Site are well below costs projected in the 1990 Feasibility Study.
- **Opportunities for Optimization:** This five-year review does not identify a method for optimization at this time. There were indications given by the on-site contractor, during one of the site visits, that there may be an effort in the future to re-evaluate ways to speed up the remediation process. Additional remediation alternatives may be investigated to enhance, but not replace, the current remediation activities. Such alternatives could be, for example, air sparging, biological or chemical enhancement of VOC removal. Again, if investigated and subsequently implemented, these alternatives are not expected to replace the current groundwater treatment system.
- **Early Indicators of Potential Remedy Failure:** Early indicators of potential remedy failure were not discovered during this review.

### **Question B: Are the assumptions used at the time of remedy selection still valid?**

- **Changes in Standards and To Be Considereds:** This five-year review did identify changes in Standards and To Be Considereds. The reader is referred to Table 7 for details.
- **Changes in Exposure Pathways:** No changes in the site conditions that affect exposure were identified as part of the five-year review. There are no current or planned changes in land use. New contaminants, sources, or routes of exposure were not identified during this five-year review. There is no indication that hydrologic/hydrogeologic conditions are not adequately characterized.
- **Changes in Toxicity and Other Containment Characteristics:** Organic and inorganic contaminant levels have decreased since the implementation of the remedy.
- **Changes in Risk Assessment Methodologies:** Changes in risk assessment methodologies since the time of the ROD do not call into question the protectiveness of the remedy.

### **Question C: Has any other information come to light that could call into question the protectiveness of the remedy?**

- No other information has come to light that could call into question the protectiveness of the remedy.

## **VIII. Issues or Deficiencies**

Initially, the groundwater remediation system was designed for a flow rate of 240 gpm, and has operated generally at rates below 170 gpm. It is suggested by USEPA that further investigation into how the ground water extraction rate can be increased is warranted.

An additional issue is the status of document submittal to the local repository. The local repository does not contain the latest documentation of activities that have taken place at the SCRDI-Bluff Road Site since the Soil Vapor Extraction (SVE) system design. It is recommended that all documentation relevant to the Site following the SVE system design be sent to the local repository. The repository is located at Richland County Public Library, Southeast Regional Branch, 7421 Garners Ferry Road, Columbia, South Carolina 29209.

## **IX. Recommendations and Follow-up Actions**

Further five-year review is not necessary for soil remediation following this initial review. Additional future policy five-year reviews for the SCRDI Bluff Road Site will be conducted based on status and conditions related to the groundwater remedy pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121(c) and OSWER Directives 9355.7-02 and 9355.7-02A.

Initially, the groundwater remediation system was designed for a flow rate of 240 gpm, and has operated generally at rates below 170 gpm. It is suggested by USEPA that further investigation into how the ground water extraction rate can be increased is warranted.

There were indications given by the on-site contractor, during one of the site visits, that there may be an effort in the future to re-evaluate ways to speed up the remediation process. Additional remediation alternatives may be investigated to enhance, but not replace, the current remediation activities. Such alternatives could be, for example, air sparging, and biological or chemical enhancement of VOC removal. Again, if investigated and subsequently implemented, these alternatives are not expected to replace the current groundwater treatment system.

## **X. Protectiveness Statement**

Based on this Five-Year Review and the above summary, all of the elements of the remedy selected by the ROD for the SCRDI Bluff Road Site have been put in place, are functioning properly, are operated and maintained adequately, and remain protective of human health and the environment.

## **XI. Next Review**

The SCRDI Bluff Road Site is a policy site that requires on-going five-year reviews. USEPA should conduct the next review within five years of completion of this first five-year review listed as the date of signature on the inside cover of this report.

FINAL

**ATTACHMENT A**  
**Documents Reviewed**

FINAL

**ATTACHMENT A**  
**Documents Reviewed**

Investigation of Ground Water at South Carolina Recycling and Disposal, Inc., Bluff Road Site, January 1981, Richland County, South Carolina, SC Department of Health and Environmental Control. (brief review at repository)

Emergency Action Plan on Bluff Road Site, South Carolina, February 1981, Ecology and Environment, Inc. (brief review at repository)

Engineering Report for the Surficial Cleanup and Disposal of Chemical Wastes, April 1985, SCR&D Bluff Road Site; Columbia, South Carolina, Camp, Dresser, and McKee, Inc. (brief review at repository)

Remedial Investigation Bluff Road Site, April 1986, Richland County South Carolina, Volume I of II, Golder Associates. (brief review at repository)

Remedial Investigation Bluff Road Site, April 1986, Richland County, South Carolina, Volume II of II, Golder Associates. (brief review at repository)

Final Sampling Plan for the Bluff Road Site, Columbia South Carolina, August 1987, Camp, Dresser & McKee, Inc. (brief review at repository)

Remedial Investigation Report SCRDI-Bluff Road Site, February 1990, Volume I IT Corporation, Knoxville TN. (copy provided to COE for review)

Remedial Investigation Report SCRDI-Bluff Road Site, February 1990, Volume II, IT Corporation, Knoxville TN. (copy provided to COE for review)

Feasibility Study Report SCRDI-Bluff Road Site, Volume I-Report, March 1990; Columbia, South Carolina. (copy provided to COE for review)

Feasibility Study Report SCRDI-Bluff Road Site, Volume II-Appendices, March 1990, Columbia, South Carolina. (copy provided to COE for review)

Feasibility Study Report Public Comments SCRDI-Bluff Road Site, June 1990, Submitted by the Bluff Road Group. (copy provided to COE for review)

Record of Decision, Remedial Alternative Selection, SCRDI Bluff Road Site, September 1990, SCRDI Bluff Road Superfund Site. (copy provided to COE for review)

Superfund Program Explanation of Significant Differences, March 1991; SCRDI Bluff Road Superfund Site, Columbia, Richland County, South Carolina, Fact Sheet Describing the change in the five-year review provisions applicable to the SCRDI Bluff Road Superfund Site. (copy provided to COE for review)

## FINAL

Superfund Program Explanation of Significant Differences, Fact Sheet, June 1994(copy provided to COE for review)

Accelerated SVE Remedial System Design, January 1994, SCRDI Bluff Road Site, Volume 1 and Volume 2, Columbia Richland, South Carolina, Prepared by Terra Vac. (Reviewed at Repository).

Public Information Meeting for the SCRDI Bluff Road Site, Richland County, South Carolina, May 16, 1994, Public Meeting Summary, Hopkins Park Community Center. (brief review at repository)

Operations and Maintenance Plan Documents, June 1996, Volume I, Construction Submittal, Operations and Maintenance Manual and Support Documents, Ground Water Recovery, Treatment and Injection System, Environmental Resources Management, Inc. (copy provided to COE for review)

Operations and Maintenance Plan Documents, June 1996, Volume II, Construction Submittal, As-Built Drawings and Equipment Operations and Maintenance Manuals, Ground Water Recovery, Treatment and Injection System, Environmental Resources Management, Inc. (copy provided to COE for review)

Ground Water Recovery Treatment, and Injection Systems Operations and Maintenance Plan, SCRDI-Bluff Road Site, June 1996, Construction Submittal, Environmental Resources Management, Inc. (copy provided to COE for review)

Ground Water Recovery Treatment, and Injection Systems Performance Standards Verification Plan, Appendix C, June 1996, Final Submittal, Environmental Resources Management, Inc. (copy provided to COE for review)

SCRDI Bluff Road Site SVE Remedial System Soil Closeout Report, August 1996, Prepared by Terra Vac. (copy provided to COE for review)

Baseline Groundwater Sampling Event for the SCRDI-Bluff Road Site, July 1996 (copy provided to COE for review)

Capture Zone Evaluation, SCRDI-Bluff Road Site, November 1997, Environmental Resources Management, Inc. (Copy provided to COE for Review)

Southwest Area Investigation Report, SCRDI-Bluff Road Site, January 1998, Environmental Resources Management, Inc. (Copy provided to COE for Review)

Review of Groundwater Recovery System Performance, June 1998, Final Report, Environmental Resources Management, Inc. (copy provided to COE for review)

Review of Groundwater Recovery System Performance, December 1998, Final Report, Environmental Resources Management, Inc. (copy provided to COE for review)

## FINAL

Review of Groundwater Recovery System Performance, January 2000, Final Report, Environmental Resources Management, Inc. (copy provided to COE for review)

Review of Groundwater Recovery System Performance, July 2001, Final Report, Environmental Resources Management, Inc. (copy provided to COE for review)

Review of Groundwater Recovery System Performance, September 2002, Final Report, Environmental Resources Management, Inc. (copy provided to COE for review)

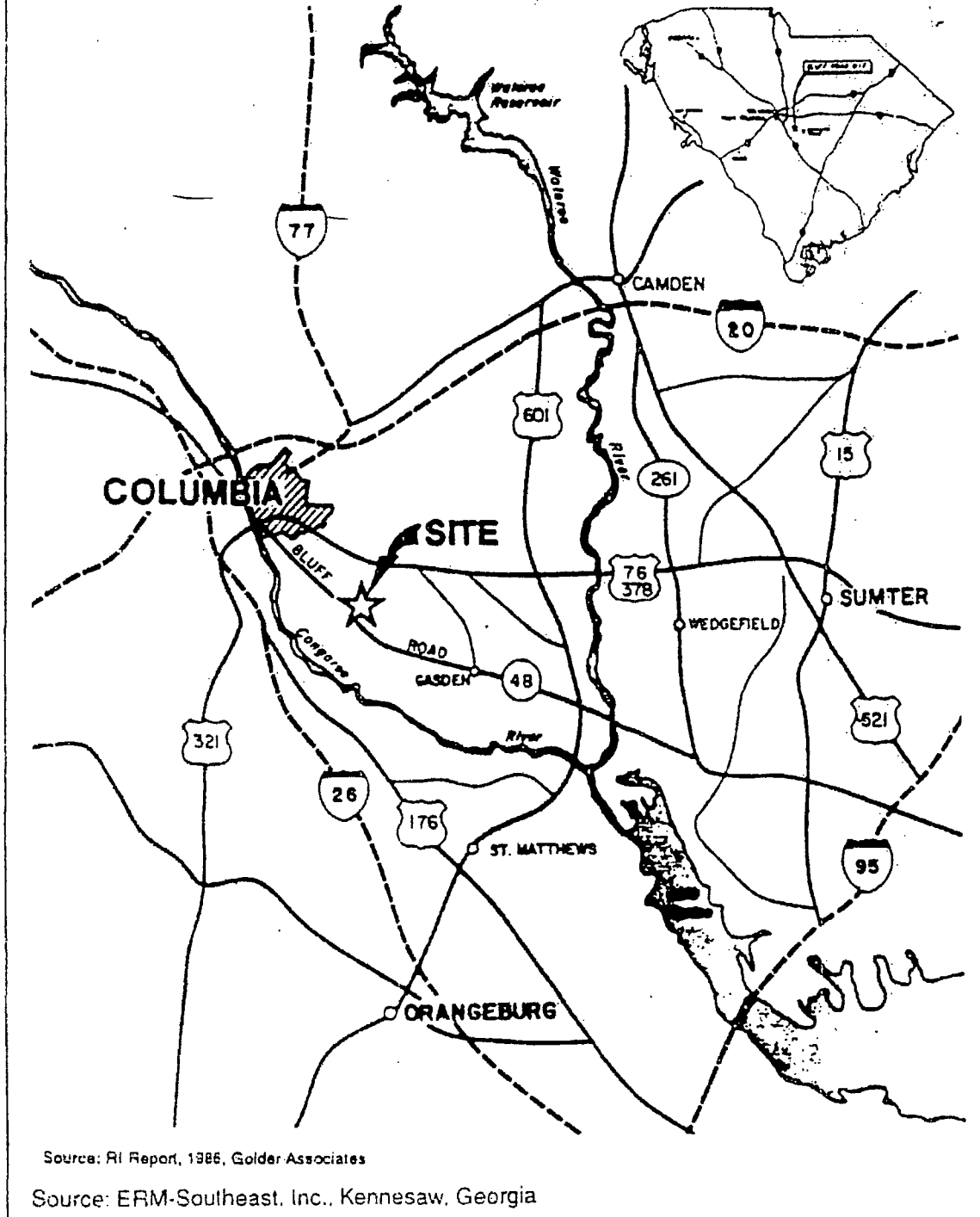
Summary of Sampling Groundwater and Recovery Wells, SCRDI, Bluff Road, Columbia, South Carolina. (copy provided to COE for review)

Monthly Progress Reports, Jan 2000 – April 2002 (copy provided to COE for review)

FINAL

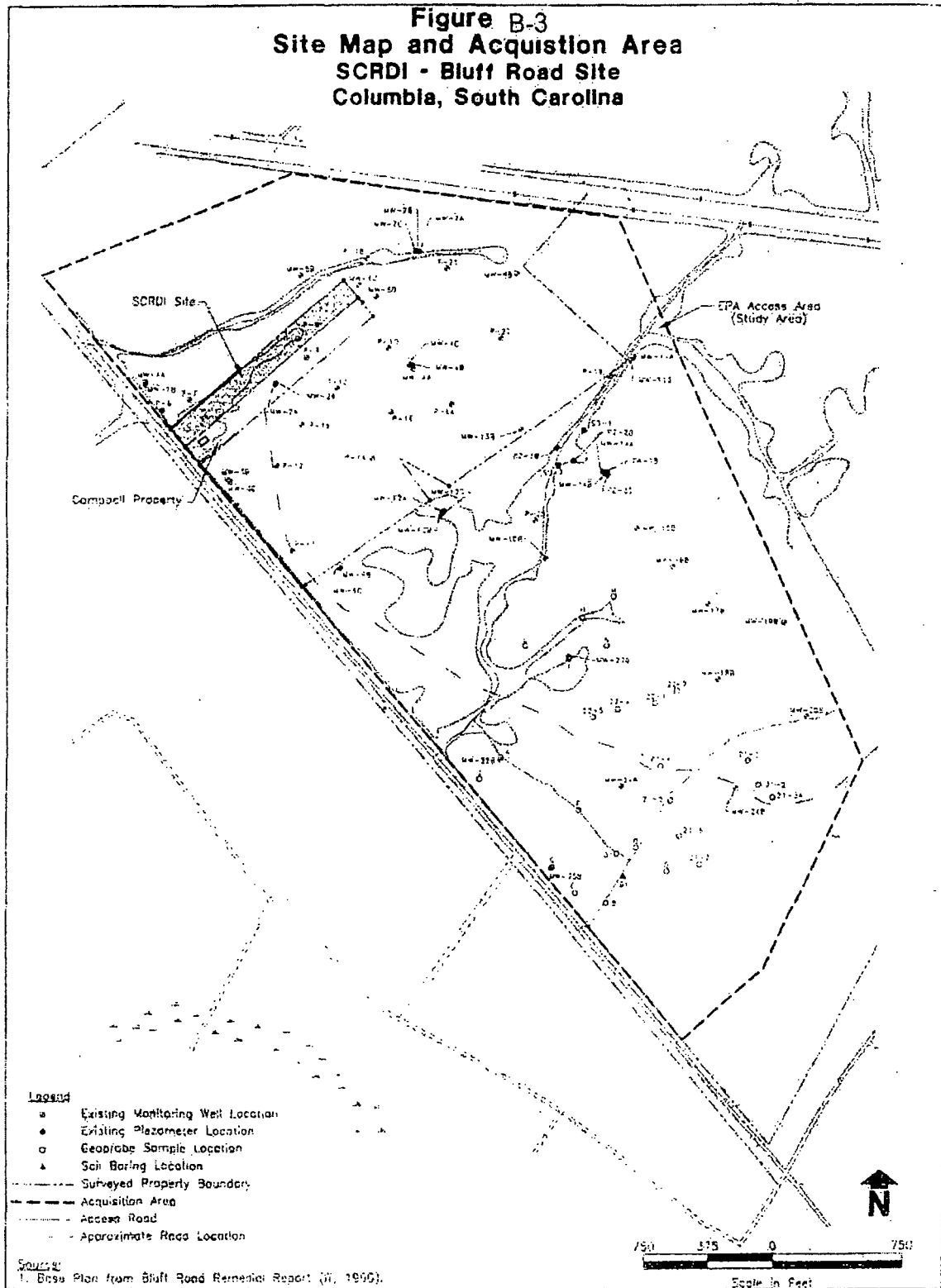
**ATTACHMENT B**  
**Site Maps and Figures**

Figure B-1  
Site Regional Setting  
SCRDI-Bluff Road Remedial Design Investigation  
Columbia, SC









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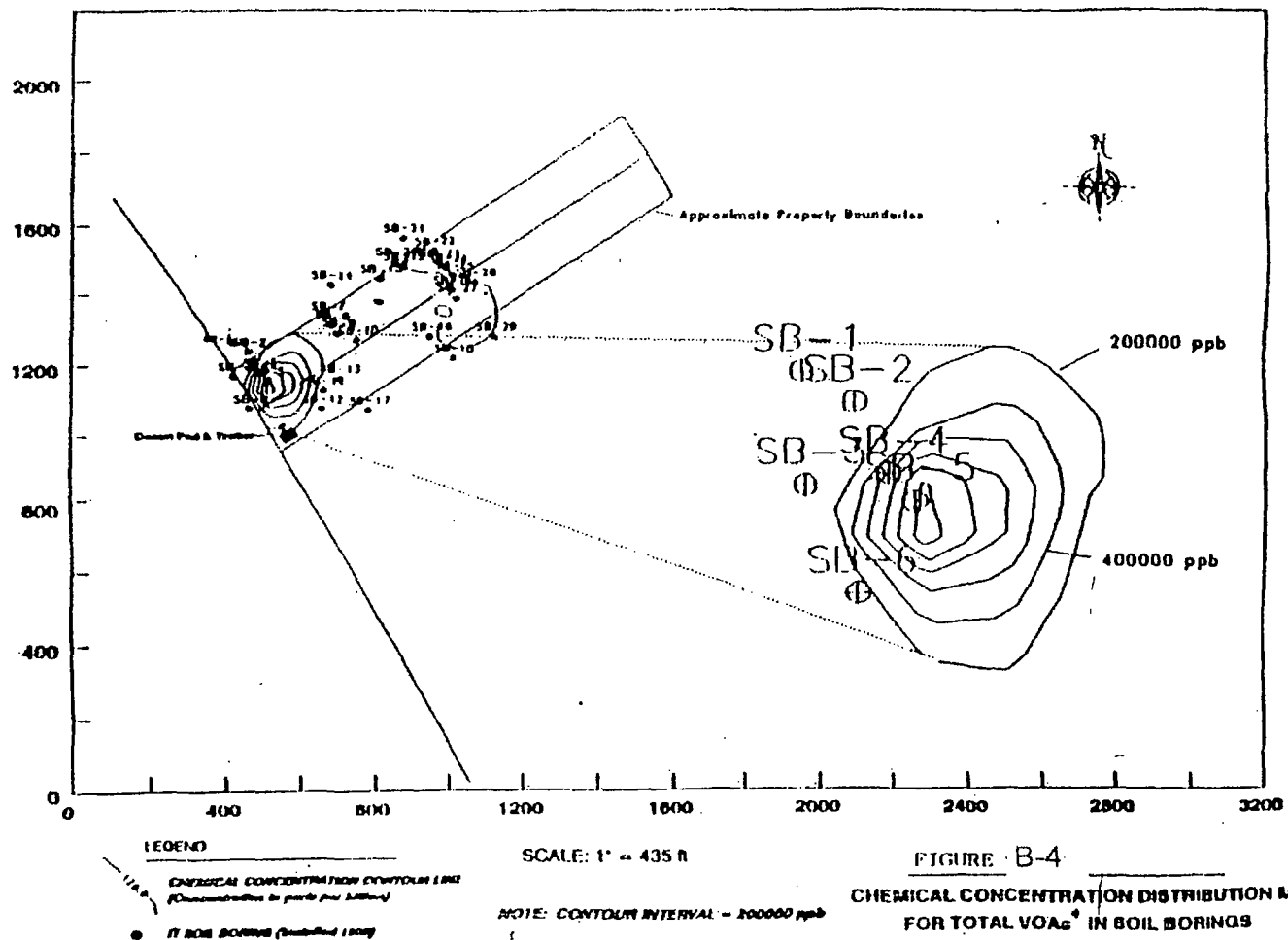
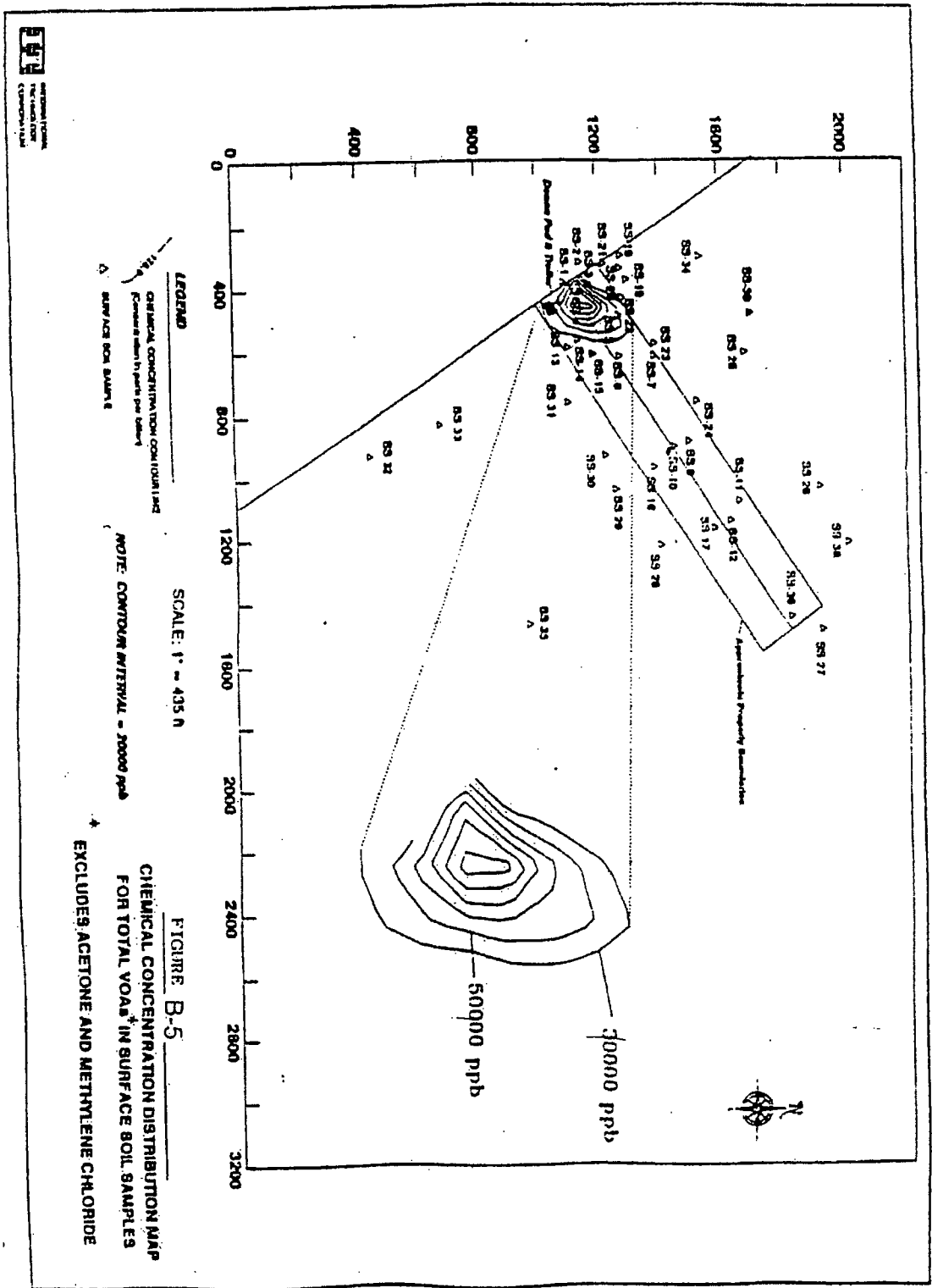
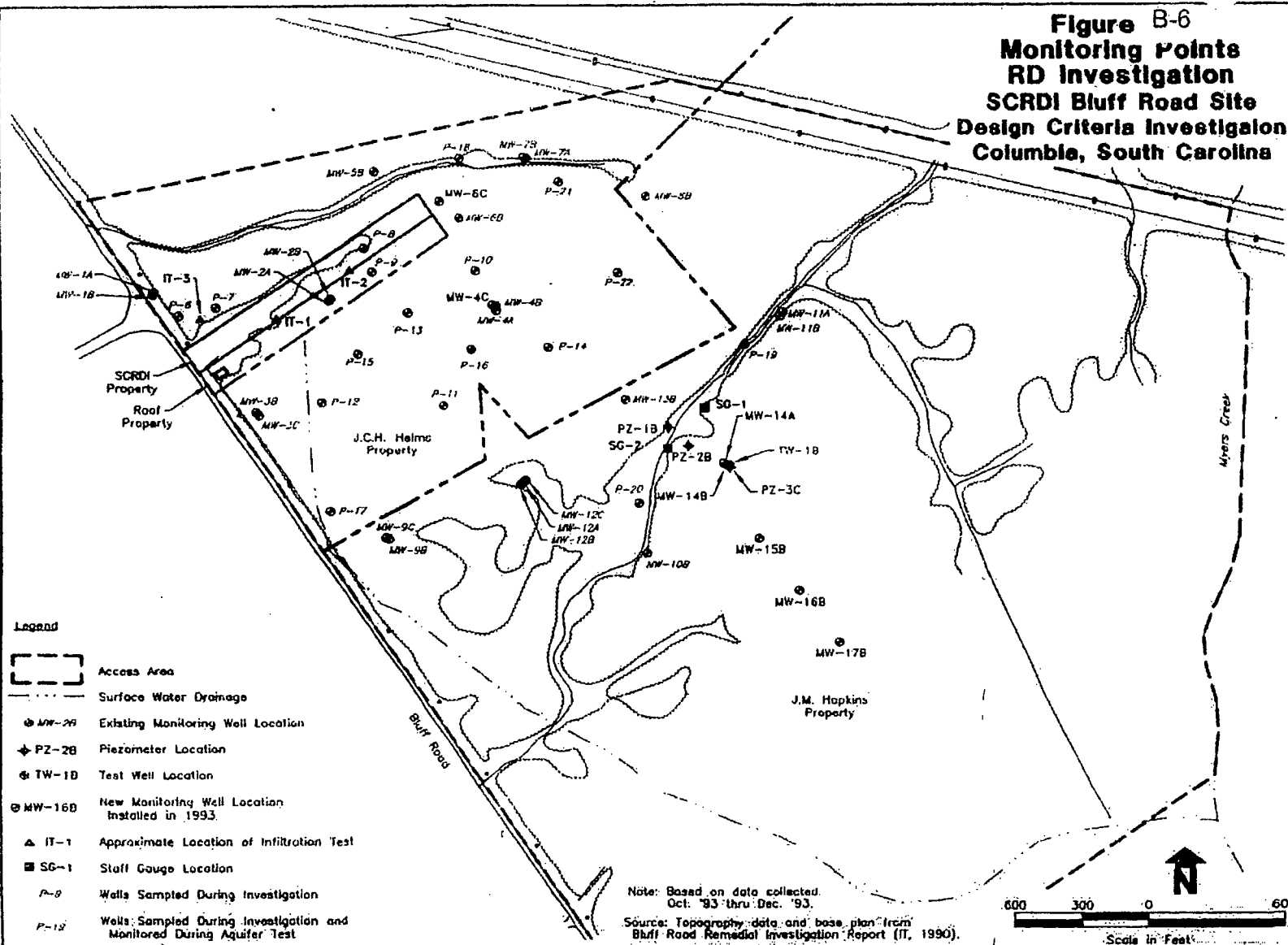


FIGURE B-4  
CHEMICAL CONCENTRATION DISTRIBUTION MAP  
FOR TOTAL VOAs\* IN SOIL BORINGS

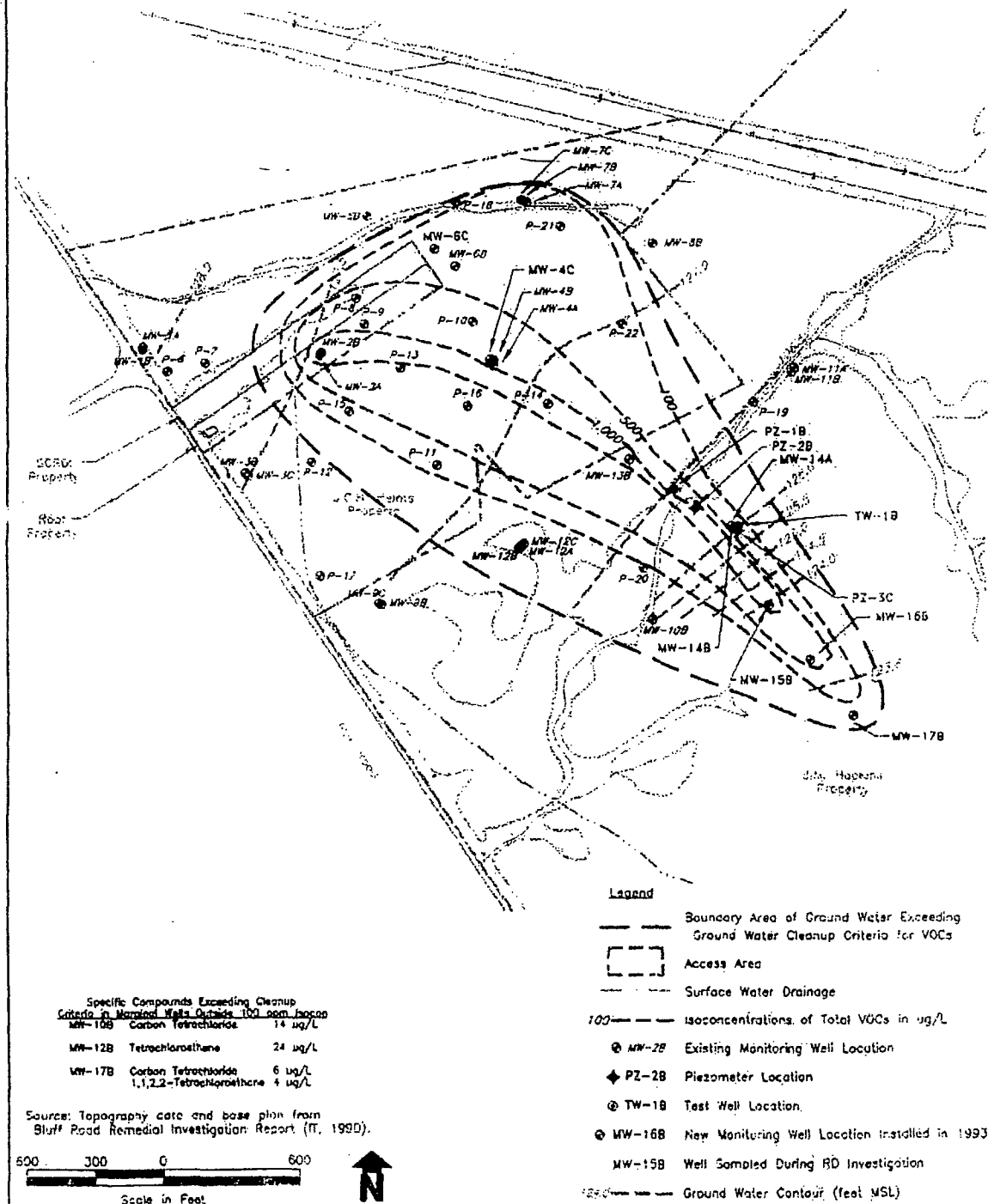
\* EXCLUDES ACETONE AND METHYLENE CHLORIDE



**Figure B-6**  
**Monitoring Points**  
**RD Investigation**  
**SCRD Bluff Road Site**  
**Design Criteria Investigation**  
**Columbia, South Carolina**

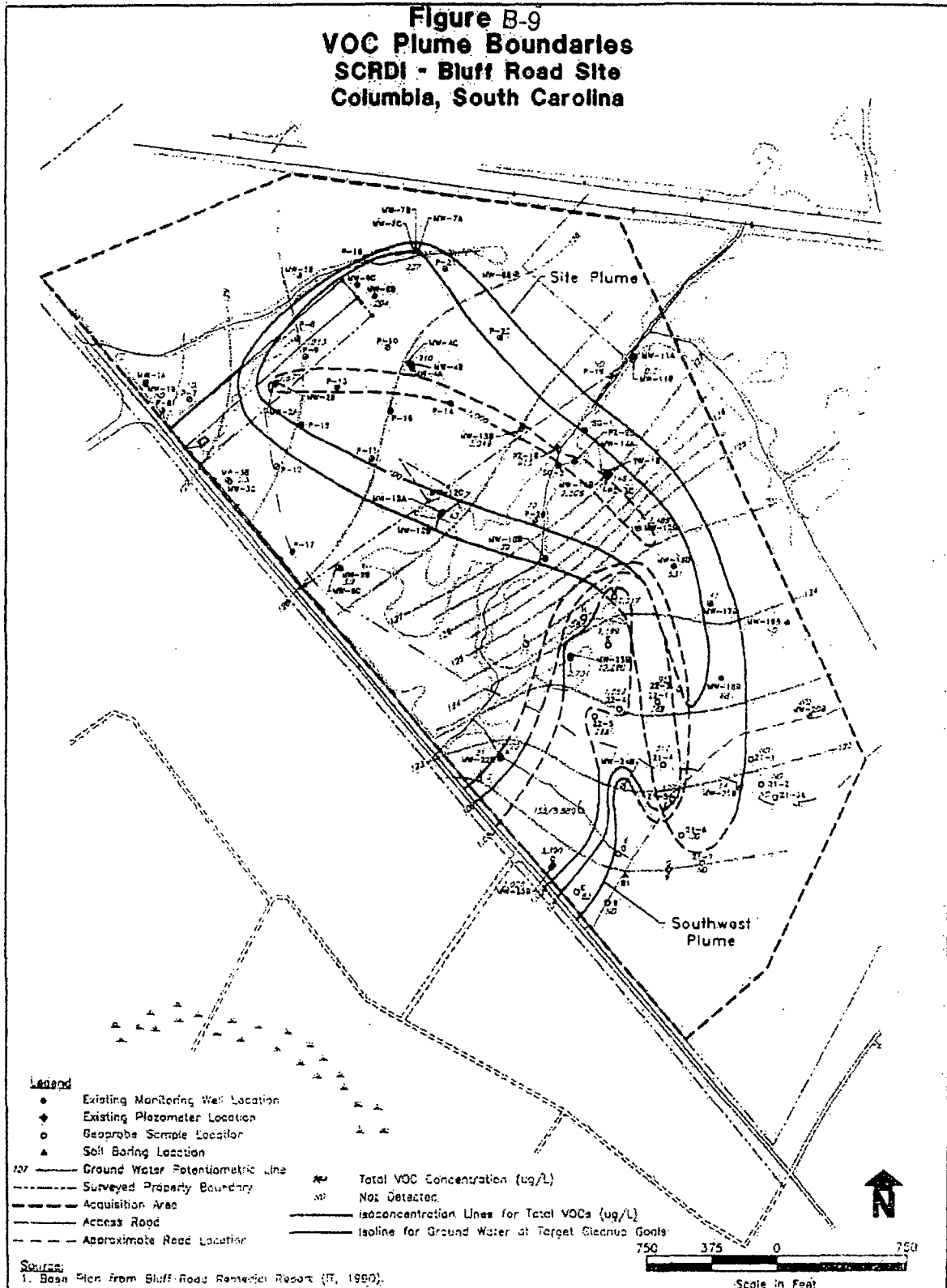


**Figure B-7**  
**VOC Plume Boundary**  
**SCRDI Bluff Road Site**  
**Design Criteria Investigation**  
**Columbia, South Carolina**



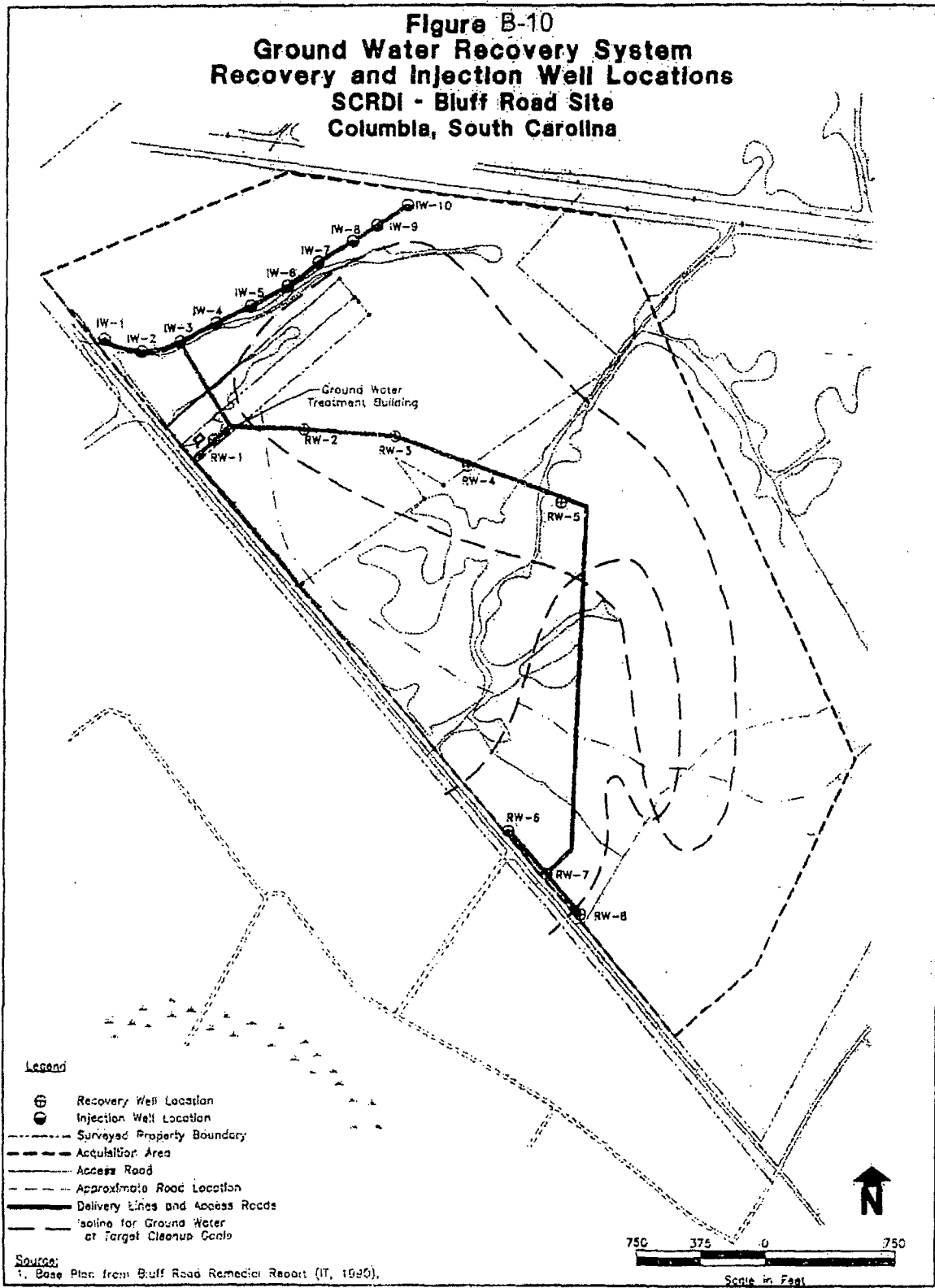


**Figure B-9**  
**VOC Plume Boundaries**  
**SCRDI - Bluff Road Site**  
**Columbia, South Carolina**





**Figure B-10**  
**Ground Water Recovery System**  
**Recovery and Injection Well Locations**  
**SCRDI - Bluff Road Site**  
**Columbia, South Carolina**



FINAL

**ATTACHMENT C**  
**Sampling Data Results**

SCRDI - Bluff Road  
Columbia, South Carolina

### Summary of sampling

### Groundwater and Recovery Wells

(through annual event of October 2002)

November 2002

Summary of Total VOC Concentrations  
 SCRD1 - Bluff Road Site  
 Columbia, South Carolina

Monitoring Well	Baseline Event Jun 96	1st Quarter Oct 96	2nd Quarter Jan 97	3rd Quarter Apr 97	Annual Event Aug 97	Semi Annual Event Mar 98	Annual Event Aug 98	Semi Annual Event Apr 99	Annual Event Sep 99	Semi Annual Event Apr 00	Annual Event Sep 00	Semi Annual Event Apr 01	Annual Event Sep 01	Semi Annual Event May 02	Annual Event Oct 02	
MW - 2A	6340	-	-	-	2282	-	2008	-	586	-	461	-	460	-	447	MW - 2A
MW - 3B	BQL	-	-	-	BQL	-	2	-	BQL	-	0.8	-	1.1	-	1.1	MW - 3B
MW - 8B	1	BQL	BQL	BQL	BQL	BQL	2	2	1	1	5	2	4	1	2	MW - 6B
MW - 9B	BQL	-	-	-	BQL	-	3	-	BQL	-	0.2	-	0.2	-	0.1	MW - 6B
MW - 10B	95	69	93	84	168	97	115	70	82	112	137	242	452	476	454	MW - 10B
MW - 11B	BQL	8	BQL	BQL	BQL	BQL	4	1	BQL	BQL	5	BQL	0.2	0.2	0.1	MW - 11B
MW - 12B	38	32	31	33	57	31	30	65	86	35	44	82	89	120	109	MW - 12B
MW - 13B	3040	-	-	-	1087	-	1112	-	869	-	610	-	202	-	89	MW - 13B
MW - 15B	943	-	-	-	748	-	1143	-	770	-	253	-	85	-	75	MW - 15B
MW - 16B	226	-	-	-	1002	-	825	-	310	-	162	-	337	-	172	MW - 16B
MW - 17B	39	-	-	-	1	-	0	-	4	-	4	-	2.8	-	3.3	MW - 17B
MW - 18B	48	-	-	-	10	-	5	-	0.3	-	0.2	-	1	-	0.4	MW - 18B
MW - 19B	BQL	BQL	BQL	BQL	BQL	BQL	5	1	BQL	0.2	0.1	0.1	0.1	0.6	0.1	MW - 19B
MW - 20B	BQL	BQL	BQL	BQL	BQL	BQL	2	1	BQL	5	0.2	5	0.4	0.3	0.1	MW - 20B
MW - 21B	31	10	24	9	5	19	18	14	13	16	12	7	4.1	2	1.5	MW - 21B
MW - 22B	28	19	137	688	823	1170	1179	1269	986	813	512	569	428	439	372	MW - 22B
MW - 23B	2887	-	-	-	1440	-	182	-	138	-	534	-	95	-	70	MW - 23B
MW - 24B	1	-	-	-	BQL	-	8	-	45	-	48	-	398	-	889	MW - 24B
MW - 25B	3703	-	-	-	2430	-	2018	-	784	-	333	-	98	-	96	MW - 25B
MW - 3C	-	-	-	-	BQL	-	-	-	-	-	-	-	-	-	-	MW - 3C
MW - 4C	-	-	-	-	BQL	-	-	-	-	-	-	-	-	-	-	MW - 4C
MW - 9C	-	-	-	-	BQL	-	-	-	-	-	-	-	-	-	-	MW - 9C
SW Area Investigation ( temporary piezometers )					SWAI Oct 97	SWAI Mar 98	SWAI Aug 98	SWAI Mar 98	SWAI Sep 99	SWAI Apr 00	SWAI Sep 00	SWAI Apr 01	SWAI Sep 01	SWAI May 02	SWAI Oct 02	
TP - 1	-	-	-	-	BQL	-	-	-	-	-	-	-	-	-	-	TP - 1
TP - 2	-	-	-	-	1.7	-	-	-	-	-	-	-	-	-	-	TP - 2
TP - 3	-	-	-	-	2.2	BQL	2	BQL	5	BQL	0.2	0.6	0.2	0.4	0.3	TP - 3
TP - 4	-	-	-	-	1987	2052	1576	3493	3111	1603	1778	658	520	355	399	TP - 4

Recovery Well	Before Start-up 08/08/96	After Start-up 08/26/96	Semi Annual Event 01/29/97	Annual Event 08/12/97	Semi Annual Event 03/24/98	Annual Event 08/25/98	Semi Annual Event 04/27/99	Annual Event 09/28/99	Semi Annual Event 04/11/00	Annual Event 09/27/00	Semi Annual Event 04/10/01	Annual Event 09/27/01	Semi Annual Event 05/01/02	Annual Event 10/02/02	
RW - 1	BQL	1	93	BQL	BQL	10	2	1	1	1	BQL	2	0.3	-	RW - 1
RW - 2	38	288	623	194	409	603	-	605	542	390	256	280	161	197	RW - 2
RW - 3	2449	-	-	-	-	-	-	-	-	-	-	-	-	-	RW - 3
RW - 4	955	1582	1501	1145	1047	1136	1388	1068	832	735	569	521	382	386	RW - 4
RW - 5	2920	3753	2293	1611	2062	2121	1857	1373	1191	954	608	580	367	304	RW - 5
RW - 6	198	547	1236	1798	1995	1924	2800	3053	1899	1941	1259	1012	852	869	RW - 6
RW - 7	1460	3321	1596	1878	1604	1491	1222	989	709	556	478	294	264	245	RW - 7
RW - 8	728	935	494	1066	1238	566	778	559	640	459	366	385	231	239	RW - 8

All results reported as ug/L

SCRDI - BLUFF ROAD

SUMMARY

SIXTH ANNUAL SAMPLING EVENT October 2002  
GROUNDWATER ANALYTICAL DATA

MONITORING WELLS									
Compound	MW-2A (ug/L)	MW-3B (ug/L)	MW-8B (ug/L)	MW-9B (ug/L)	MW-10B (ug/L)	MW-11B (ug/L)	MW-12B (ug/L)	MW-13B (ug/L)	MW-15B (ug/L)
Acetone	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Benzene	60	BQL	BQL	BQL	3 J	BQL	BQL	BQL	BQL
Carbon Tetrachloride	BQL	BQL	BQL	BQL	2 J	BQL	1	3	4
Chlorobenzene	BQL	BQL	BQL	BQL	3 J	BQL	BQL	BQL	BQL
Chloroform	BQL	1	0.4	BQL	23	BQL	3	28	28
1,1 Dichloroethane	15	BQL	0.1 J	BQL	57	BQL	12	13	9
1,2 Dichloroethane	43	BQL	0.1 J	BQL	14	BQL	1	3	1
1,1 Dichloroethene	65	BQL	BQL	BQL	60	BQL	9	8	9
1,2 Dichloroethene	220	BQL	BQL	BQL	250	BQL	75	19	11
1,2 Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.2 J	0.1 J
Ethylbenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methylene Chloride	20 B	0.1 JB	0.1 JB	0.1 JB	19 B	0.1 JB	0.3 JB	2 B	0.2 JB
1,1,2,2 Tetrachloroethane	BQL	BQL	0.7	BQL	8	BQL	0.5 J	3	3
Tetrachloroethene	BQL	BQL	BQL	BQL	7	BQL	5	4	4
Toluene	22	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1,1 Trichloroethane	BQL	BQL	BQL	BQL	3 J	BQL	1	1	1
1,1,2 Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	1	0.4 J
Trichloroethene	BQL	BQL	0.1 J	BQL	5 J	BQL	1	4	4
Xylene (total)	2 J	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2-Butanone	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
TOTAL VOCs	447	1.1	2	0.1	454	0.1	109	89	75

Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Annual sampling event September 27 - October 1, 1999

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample  
It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

D - This flag indicates compounds identified at a secondary dilution factor

SCRDI - BLUFF ROAD

SUMMARY  
SIXTH ANNUAL SAMPLING EVENT October 2002  
GROUNDWATER ANALYTICAL DATA

MONITORING WELLS										
Compound	MW-16B (ug/L)	MW-17B (ug/L)	MW-18B (ug/L)	MW-19B (ug/L)	MW-20B (ug/L)	MW-21B (ug/L)	MW-22B (ug/L)	MW-23B (ug/L)	MW-24B (ug/L)	MW-25B (ug/L)
Acetone	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Benzene	BQL	BQL	BQL	BQL	BQL	BQL	2 J	0.6	BQL	BQL
Carbon Tetrachloride	8	0.6	0.1 J	BQL	BQL	0.7	6	0.8	67 D	8
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.3 J	BQL	BQL
Chloroform	66	0.5	0.1 J	BQL	BQL	0.2 J	31	10	360 D	46
1,1 Dichloroethane	25	BQL	BQL	BQL	BQL	BQL	59	12	6	2 J
1,2 Dichloroethane	2	BQL	BQL	BQL	BQL	BQL	12	3	5 J	1 J
1,1,1 Trichloroethane	14	0.2 J	BQL	BQL	BQL	BQL	53	10	51	6
1,2 Dichloroethane	28	BQL	BQL	BQL	BQL	BQL	150	16	8	2 J
1,2 Dichloropropane	0.3 J	BQL	BQL	BQL	BQL	BQL	BQL	0.2 J	BQL	BQL
Ethylbenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methylene Chloride	7 B	0.1 JB	0.1 JB	BQL	0.1 JB	0.1 JB	26 B	0.4 JB	21 B	13 B
1,1,1,2,2 Tetrachloroethane	5	1	BQL	BQL	BQL	BQL	7	3	38	6
Tetrachloroethane	6	0.3 J	BQL	BQL	BQL	BQL	12	7	43 D	5
Toluene	BQL	BQL	BQL	BQL	BQL	0.2 J	BQL	BQL	BQL	BQL
1,1,1 Trichloroethane	2	BQL	BQL	BQL	BQL	BQL	4 J	1	13 D	1 J
1,1,2 Trichloroethane	0.7	BQL	BQL	BQL	BQL	BQL	BQL	0.4 J	BQL	BQL
Trichloroethane	8	0.6	BQL	BQL	BQL	0.1 J	11	5	57 D	6
Xylene (total)	BQL	BQL	0.1 J	0.1 J	BQL	0.2 J	BQL	0.2 J	BQL	BQL
2-Butanone	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
TOTAL	172	3.3	0.4	0.1	0.1	1.5	372	70	669	96

Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Annual sampling event September 27 - October 1, 1999

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample.  
It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

D - This flag indicates compounds identified at a secondary dilution factor

SCRDI - BLUFF ROAD

SUMMARY

SIXTH ANNUAL SAMPLING EVENT October 2002

RECOVERY WELL ANALYTICAL DATA

Compound	RECOVERY WELLS							
	RW - 1 (ug/L)	RW - 2 (ug/L)	RW - 3 (ug/L)	RW - 4 (ug/L)	RW - 5 (ug/L)	RW - 6 (ug/L)	RW - 7 (ug/L)	RW - 8 (ug/L)
Acetone	BQL	BQL	NS	BQL	BQL	BQL	BQL	BQL
Benzene	BQL	5	NS	2 J	1 J	3 J	BQL	BQL
Carbon tetrachloride	BQL	0.7 J	NS	7	12	49	36	41
Chlorobenzene	BQL	3 J	NS	0.9 J	BQL	1 J	BQL	BQL
Chloroform	BQL	5 J	NS	50	74	300	110	100
1,1-Dichloroethane	BQL	21	NS	82	47	82	3 J	2 J
1,2-Dichloroethane	BQL	3 J	NS	7	6	13	3 J	3 J
1,1-Dichloroethene	BQL	22	NS	60	35	94	20	20
1,2-Dichloroethene (Total)	BQL	120	NS	130	71	120	4 J	3 J
1,2-Dichloropropane	BQL	BQL	NS	BQL	BQL	2 J	BQL	BQL
Ethylbenzene	BQL	1 J	NS	BQL	BQL	BQL	BQL	BQL
Methylene chloride	BQL	9 B	NS	8 B	7 B	33 B	15 B	15 B
1,1,2,2-Tetrachloroethane	BQL	BQL	NS	7	9	24	11	11
Tetrachloroethene	0.3 J	2 J	NS	13	16	60	20	20
Toluene	BQL	1 J	NS	BQL	BQL	BQL	BQL	BQL
1,1,1-Trichloroethane	BQL	0.9 J	NS	3 J	3 J	17	5 J	5 J
1,1,2-Trichloroethane	BQL	BQL	NS	BQL	1 J	3 J	BQL	BQL
Trichloroethene	BQL	2 J	NS	15	22	68	18	19
Xylene (Total)	BQL	1 J	NS	1 J	BQL	BQL	BQL	BQL
2-Butanone	BQL	BQL	NS	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone	BQL	BQL	NS	BQL	BQL	BQL	BQL	BQL
TOTAL VOCs	0.3	197	NS	386	304	869	245	239

NOTES

BQL = Below Quantitation Limit

NS = Not Sampled

NR = Not reported

All results reported ug/L

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

D - This flag indicates compounds identified at a secondary dilution factor

SCRD - BLUFF ROAD

TEMPORARY PIEZOMETERS ANALYTICAL DATA SUMMARY  
TP-1, TP-2, TP-3, TP-4

TP - 1		TP - 2		TP-3									
Compound	Oct 97	Oct 97	Oct 97	Mar 98	Aug 98	Apr 99	Sept 99	Apr 00	Oct 00	Apr 01	Sept 01	May 02	Oct 02
TCL VOLATILES (ug/L)													
Acetone	BQL	BQL	BQL	BQL	2 BJ	BQL	2 J	BQL	BQL	BQL	BQL	BQL	BQL
Benzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Carbon tetrachloride	BQL	BQL	0.5	BQL	BQL	BQL	0.2 J	BQL	BQL	BQL	BQL	BQL	BQL
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	BQL	1.7	1.7	BQL	BQL	BQL	2	BQL	0.1 J	0.2 J	BQL	0.2 J	BQL
1,1-Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2-Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1-Dichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	0.2 J	BQL	BQL	BQL	BQL	BQL	BQL
1,2-Dichloroethene (Total)	BQL	BQL	BQL	BQL	BQL	BQL	0.1 J	BQL	BQL	BQL	BQL	BQL	BQL
1,2-Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methylene chloride	BQL	BQL	BQL	BQL	BQL	BQL	0.4 JB	BQL	0.1 JB	BQL	0.2 JB	0.2 JB	0.3 JB
1,1,2,2-Tetrachloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Tetrachloroethene	BQL	BQL	BQL	BQL	BQL	BQL	0.1 J	BQL	BQL	BQL	BQL	BQL	BQL
Toluene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.4 J	BQL	BQL	BQL
1,1,1-Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1,2-Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Trichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	0.2 J	BQL	BQL	BQL	BQL	BQL	BQL
Xylene (Total)	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2-Butanone	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
TOTAL VOCs	BQL	1.7	2.2	BQL	2	BQL	5.2	BQL	0.2	0.6	0.2	0.4	0.3

NOTES

BQL = Below Quantitation Limit

Method 524.2 used for Southwest Area Investigation

All results reported ug/L

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

D - This flag indicates compounds identified at a secondary dilution factor



SCRDI - BLUFF ROAD

TEMPORARY PIEZOMETERS ANALYTICAL DATA SUMMARY  
TP-1, TP-2, TP-3, TP-4

Compound	TP - 4										
	Oct 97	Mar 98	Aug 98	Apr 99	Sept 99	Apr 00	Oct 00	Apr 01	Sept 01	May 02	Oct 02
<b>TCL VOLATILES (ug/L)</b>											
Acetone	BQL	BQL	78 BJ	BQL	270 J	BQL	190 J	BQL	BQL	BQL	BQL
Benzene	BQL	BQL	BQL	BQL	BQL	0.4 J	BQL	BQL	BQL	BQL	BQL
Carbon tetrachloride	270	330	85	290	190	140 D	110	64 D	59	35	43
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	0.06 J	BQL	BQL	BQL	BQL	BQL
Chloroform	860	1000	800	1800	1400	880 D	780	360 D	260	170	200
1,1-Dichloroethane	BQL	BQL	42	88	66	37 D	35	16 D	11	7 J	8
1,2-Dichloroethane	34	BQL	31	51	41 J	25 D	18 J	8 JD	7	4 J	5 J
1,1-Dichloroethene	160	220	130	340	190	130 D	130	59 D	41	28	34
1,2-Dichloroethene (Total)	BQL	BQL	46	100	73	37 D	36	15 D	13	8 J	9
1,2-Dichloropropane	BQL	BQL	3 J	BQL	BQL	2	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methylene chloride	BQL	BQL	30 B	24	330 B	24 JB	170 B	4 JBD	22 B	28	21 B
1,1,2,2-Tetrachloroethane	120	88	120	180	160	74 D	75	32 D	32	19	16
Tetrachloroethene	200	190	74	230	140	89 D	97	36 D	31	22	25
Toluene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1,1-Trichloroethane	83	84	46	130	81	55 D	37	16 D	11	7 J	8
1,1,2-Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Trichloroethene	140	140	91	260	170	110 D	100	48 D	36	27	30
Xylene (Total)	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2-Butanone	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
<b>TOTAL VOCs</b>	<b>1967</b>	<b>2052</b>	<b>1576</b>	<b>3493</b>	<b>3111</b>	<b>1603</b>	<b>1778</b>	<b>658</b>	<b>520</b>	<b>355</b>	<b>399</b>

NOTES

BQL = Below Quantitation Limit

Method 524.2 used for Southwest Area Investigation

All results reported ug/L

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

D - This flag indicates compounds identified at a secondary dilution factor.

# SCRDI - BLUFF ROAD

## MW - 2A

### GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/L)	Aug 1997 Annual (ug/L)	Aug 1998 Annual (ug/L)	Sep 99 Annual (ug/L)	Sep 00 Annual (ug/L)	Sep 01 Annual (ug/L)	Oct 02 Annual (ug/L)
Acetone			110 BJ	36 J	BQL	BQL	BQL
Benzene	BQL		35	13	17	15	60
Carbon Tetrachloride	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1 Dichloroethane	460	190	120	27	26	24	15
1,2 Dichloroethane	260	660	220	88	110	72	43
1,1 Dichloroethene	640	1200	840	220	130	170	65
1,2 Dichloroethene	4500	BQL	540	110	140	120	220
1,2 Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	BQL		BQL	BQL	BQL	BQL	BQL
Methylene Chloride	BQL	BQL	34 B	30 B	11	14 B	20 B
1,1,2,2 Tetrachloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Tetrachloroethene	BQL	BQL	BQL	2 J	1	13	BQL
Toluene	350		100	38	20	3 J	22
1,1,1 Trichloroethane	BQL	92	BQL	BQL	BQL	2 J	BQL
1,1,2 Trichloroethane	BQL	BQL	BQL	BQL	2	16	BQL
Trichloroethene	BQL	120	BQL	BQL	2	19	BQL
Xylene (total)	130		9 J	2 J	2	1 J	2 J
2-Butanone			BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL
<b>TOTAL VOCs</b>	<b>6340</b>	<b>2262</b>	<b>2008</b>	<b>566</b>	<b>461</b>	<b>469</b>	<b>447</b>

#### Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

FINAL

SCRDI - BLUFF ROAD

MW - 3B

GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/L)	Aug 1997 Annual (ug/L)	Aug 1998 Annual (ug/L)	Sep 1999 Annual (ug/L)	Sep 00 Annual (ug/L)	Sep 01 Annual (ug/L)	Oct 02 Annual (ug/L)
Acetone			2 BJ	BQL	BQL	BQL	BQL
Benzene	BQL		BQL	BQL	BQL	BQL	BQL
Carbon Tetrachloride	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	BQL	BQL	BQL	BQL	0.6	0.9	1
1,1 Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1 Dichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	BQL		BQL	BQL	BQL	BQL	BQL
Methylene Chloride	BQL	BQL	BQL	BQL	BQL	0.2 JB	0.1 JB
1,1,2,2 Tetrachloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Tetrachloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Toluene	BQL		BQL	BQL	BQL	BQL	BQL
1,1,1 Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1,2 Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Trichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Xylene (total)	BQL		BQL	BQL	BQL	BQL	BQL
2-Butanone			BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL

TOTAL VOCs BQL BQL 2 BQL 0.6 1.1 1.1

Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

SCRDI - BLUFF ROAD

MW - 8B  
GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/l)	Aug 1997 Annual (ug/l)	Mar 1998 Semiannual (ug/l)	Aug 1998 Annual (ug/l)	Apr 1999 Semiannual (ug/l)	Sep 1999 Annual (ug/l)	Apr 2000 Semiannual (ug/l)	Sep 2000 Annual (ug/l)	Apr 2001 Semiannual (ug/l)	Sep 2001 Annual (ug/l)	Apr 2002 Semiannual (ug/l)	Oct 2002 Annual (ug/l)
Acetone			BQL	2 BJ	1 JB	BQL	BQL	4 J	BQL	BQL	BQL	BQL
Benzene	BQL		BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Carbon Tetrachloride	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	BQL	BQL	BQL	BQL	0.4 J	0.6	0.5 J	0.5 J	0.6	0.6	0.5	0.4
1,1 Dichloroethane	BQL	BQL	BQL	BQL	0.1 J	0.2 J	0.1 J	0.1 J	0.1 J	0.2 J	0.1 J	0.1 J
1,2 Dichloroethane	BQL	BQL	BQL	BQL	0.1 J	0.1 J	0.1 J	BQL	0.1 J	0.2 J	BQL	0.1 J
1,1 Dichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.1 J	BQL	BQL
1,2 Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methylene Chloride	BQL	BQL	BQL	0.2 BJ	BQL	BQL	0.1 JB	0.5 B	BQL	0.4 JB	BQL	0.1 JB
1,1,2,2 Tetrachloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.7	2	0.5	0.7
Tetrachloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Toluene	0.8		BQL	BQL	BQL	BQL	BQL	BQL	0.5	BQL	BQL	BQL
1,1,1 Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1,2 Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Trichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.2 J	0.1 J	0.1 J
Xylene (total)	BQL		BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2-Butanone			BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
TOTAL VOCs	0.8	BQL	BQL	2.2	1.5	0.9	0.8	5.4	2.0	4	1	2

Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample.  
It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

D - This flag indicates compounds identified at a secondary dilution factor

# SCRDI - BLUFF ROAD

MW - 9B

## GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/l)	Aug 1997 Annual (ug/l)	Aug 1998 Annual (ug/l)	Sept 1999 Annual (ug/l)	Sept 2000 Annual (ug/l)	Sept 2001 Annual (ug/l)	Oct 2002 Annual (ug/l)
Acetone			3 EJ	BQL	BQL	BQL	BQL
Benzene	BQL		BQL	BQL	BQL	BQL	BQL
Carbon Tetrachloride	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1 Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1 Dichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	BQL		BQL	BQL	BQL	BQL	BQL
Methylene Chloride	BQL	BQL	BQL	BQL	0.2 JB	0.2 JB	0.1 JB
1,1,2,2 Tetrachloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Tetrachloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Toluene	BQL		BQL	BQL	BQL	BQL	BQL
1,1,1 Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1,2 Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Trichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Xylene (total)	BQL		BQL	BQL	BQL	BQL	BQL
2-Butanone			BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL

TOTAL  
VOCs

BQL

BQL

3

BQL

0.2

0.2

0.1

### Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

SCRDI - BLUFF ROAD

MW - 10B

GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/L)	Aug 1997 Annual (ug/L)	Mar 1998 Semiannual (ug/L)	Aug 1998 Annual (ug/L)	Apr 1999 Semiannual (ug/L)	Sept 1999 Annual (ug/L)	Apr 2000 Semiannual (ug/L)	Sept 2000 Annual (ug/L)	Apr 2001 Semiannual (ug/L)	Sept 2001 Annual (ug/L)	May 2002 Semiannual (ug/L)	Oct 2002 Annual (ug/L)
Acetone			BQL	BQL	1 JB	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Benzene	BQL		BQL	BQL	BQL	BQL	0.08 J	BQL	0.8	3 J	4 J	3 J
Carbon Tetrachloride	15	BQL	5	4	2	3	3	3 D	3	2 J	2 J	2 J
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	1	3 J	5 J	3 J
Chloroform	14	BQL	4	4	4	6	19	15 D	29 D	42	28	23
1,1 Dichloroethane	15	43	26	30	22	20	18	22 D	32 D	56	68	57
1,1 Dichloroethene	BQL	BQL	BQL	0.8 J	0.8	1	3	3 D	6	12	15	14
1,1,1 Trichloroethane	18	80	35	15	21	24	18	26 D	28 D	48	55	60
1,1,2 Trichloroethene	BQL	BQL	BQL	3	3	7	25	38 D	110 D	240	280	250
1,2 Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.1 J	0.3 J	BQL	0.7 J	BQL
Ethylbenzene	BQL		BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methylene Chloride	BQL	BQL	BQL	BQL	0.1 JB	0.1 JB	0.2 JB	2 BD	1 B	5 JB	10 B	10 B
1,1,2,2 Tetrachloroethane	2	BQL	2	2 J	2	3	7	7 D	10	15	12	8
Tetrachloroethene	5	BQL	6	4	2	5	8	8 D	9	12	8	7
Toluene	BQL		BQL	BQL	BQL	BQL	BQL	BQL	0.4 J	BQL	BQL	BQL
1,1,1 Trichloroethane	22	45	17	20	11	11	7	8 D	5 D	5	3 J	3 J
1,1,2 Trichloroethane	BQL	BQL	BQL	BQL	0.3 J	0.3 J	BQL	0.4 JD	0.7	BQL	1 J	BQL
Trichloroethene	3	BQL	2	2 J	1	2	4	4 D	8	8	6	5 J
Xylene (total)	BQL		BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.7 J	BQL
2-Butanone			BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
TOTAL VOCs	95	168	97	115	70.2	82	112	137	242	452	476	454

Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL... below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

D - This flag indicates compounds identified at a secondary dilution factor

FINAL

SCRDI - BLUFF ROAD

MW - 11B

GROUNDWATER ANALYTICAL DATA

Compound	Jun 1998 Baseline (ug/l)	Aug 1997 Annual (ug/l)	Mar 1998 Semiannual (ug/l)	Aug 1998 Annual (ug/l)	Apr 1999 Semiannual (ug/l)	Sept 1999 Annual (ug/l)	Apr 2000 Semiannual (ug/l)	Sept 2000 Annual (ug/l)	Apr 2001 Semiannual (ug/l)	Sept 2001 Annual (ug/l)	May 2002 Semiannual (ug/l)	Oct 2002 Annual (ug/l)
Acetone			BQL	1 BJ	1 JB	BQL	BQL	5 B	BQL	BQL	BQL	BQL
Benzene	BQL		BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Carbon Tetrachloride	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1 Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1 Dichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	BQL		BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methylene Chloride	BQL	BQL	BQL	BQL	0.1 JB	BQL	BQL	0.1 JB	BQL	0.2 JB	0.2 JB	0.1 JB
1,1,2,2 Tetrachloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Tetrachloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Toluene	BQL		BQL	BQL	BQL	BQL	BQL	BQL	0.2 J	BQL	BQL	BQL
1,1,1 Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1,2 Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Trichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Xylene (total)	BQL		BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2-Butanone			BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
TOTAL VOCs	BQL	BQL	BQL	4	1	BQL	BQL	5	0.2	0.2	0.2	0.1

Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1998

BQL - below quantitation limits.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

D - This flag indicates compounds identified at a secondary dilution factor

SCRDI - BLUFF ROAD

MW - 12B

GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/l)	Aug 1997 Annual (ug/l)	Mar 1998 Semiannual (ug/l)	Aug 1998 Annual (ug/l)	Apr 1999 Semiannual (ug/l)	Sept 1999 Annual (ug/l)	Apr 2000 Semiannual (ug/l)	Sept 2000 Annual (ug/l)	Apr 2001 Semiannual (ug/l)	Sept 2001 Annual (ug/l)	May 2002 Semiannual (ug/l)	Oct 2002 Annual (ug/l)
Acetone	BQL		BQL	3 BJ	BQL	BQL	BQL	2 J	BQL	BQL	BQL	BQL
Benzene	BQL		BQL	BQL	BQL	0.1 J	BQL	BQL J	BQL	BQL	BQL	BQL
Carbon Tetrachloride	7	BQL	3	3	2	3	2	2	1	1	1 J	1
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	2	2.2	2	1	2	2	2	2	2	2	3	3
1,1 Dichloroethane	7	9.8	6	5	11	11	6	6	14	14	16	12
1,2 Dichloroethane	BQL	BQL	BQL	BQL	2	1	0.6	0.4 J	1	1	1 J	1
1,1 Dichloroethene	4	11	5	5	9	11	4	6	8	8	9	9
1,2 Dichloroethene	BQL	BQL	BQL	0.4 J	31	25	11	14	49	54	80	75
1,2 Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methylene Chloride	BQL	BQL	BQL	0.1 BJ	0.3 JB	BQL	0.1 JB	0.3 JB	0.1 JB	1 B	5 B	0.3 JB
1,1,2,2 Tetrachloroethane	BQL	BQL	BQL	BQL	1	0.7	0.5	0.4 J	0.8	0.6	BQL	0.5 J
Tetrachloroethene	15	21	12	10	4	8	6	8	4	5	4	5
Toluene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.3 J	BQL	BQL	BQL
1,1,1 Trichloroethane	3	5.8	3	2	2	3	2	2	1	2	1 J	1
1,1,2 Trichloroethane	BQL	BQL	BQL	BQL	BQL	0.2 J	BQL	BQL	BQL	BQL	BQL	BQL
Trichloroethene	BQL	7.0	BQL	0.3 J	0.8 J	0.7	0.4 J	0.4 J	0.5	0.7	0.9 J	1
Xylene (total)	BQL		BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2-Butanone			BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
TOTAL VOCs	38	56.6	31	30	65	66	35	44	82	89	120	109

Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

J - Indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

D - This flag indicates compounds identified at a secondary dilution factor



# SCRDI - BLUFF ROAD

MW - 13B

## GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/l)	Aug 1997 Annual (ug/l)	Aug 1998 Annual (ug/l)	Sept 1999 Annual (ug/l)	Sept 2000 Annual (ug/l)	Sept 2001 Annual (ug/l)	Oct 2002 Annual (ug/l)
Acetone			79 BJ	BQL	62	BQL	BQL
Benzene	BQL		BQL	BQL	BQL	BQL	BQL
Carbon Tetrachloride	130	BQL	26	16	15	6	3
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	1300	540	440	290	200	73	28
1,1 Dichloroethane	210	140	120	90	85	26	13
1,2 Dichloroethane	BQL	BQL	11 J	10	10	5	3
1,1 Dichloroethene	430	350	130	54	62	19	8
1,2 Dichloroethene	200	BQL	120	110	95	40	19
1,2 Dichloropropane	BQL	BQL	BQL	2 J	1 J	BQL	0.2 J
Ethylbenzene	BQL		BQL	BQL	BQL	BQL	BQL
Methylene Chloride	BQL	BQL	25 BJ	4 JB	10 B	6 B	2 B
1,1,2,2 Tetrachloroethane	140	BQL	32	24	17	6	3
Tetrachloroethene	230	BQL	48	22	18	8	4
Toluene	BQL		BQL	BQL	BQL	0.6 J	BQL
1,1,1 Trichloroethane	250	57	34	14	9	2 J	1
1,1,2 Trichloroethane	BQL	BQL	BQL	4 J	4 J	2 J	1
Trichloroethene	150	BQL	47	29	22	8	4
Xylene (total)	BQL		BQL	BQL	BQL	BQL	BQL
2-Butanone			BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL
<b>TOTAL VOCs</b>	<b>3040</b>	<b>1087</b>	<b>1112</b>	<b>669</b>	<b>610</b>	<b>202</b>	<b>89</b>

### Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample.  
It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

FINAL

SCRDI - BLUFF ROAD

MW - 15B

GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/l)	Aug 1997 Annual (ug/l)	Aug 1998 Annual (ug/l)	Sept 1999 Annual (ug/l)	Sept 2000 Annual (ug/l)	Sept 2001 Annual (ug/l)	Oct 2002 Annual (ug/l)
Acetone			18 BJ	BQL	BQL	BQL	BQL
Benzene	BQL		BQL	BQL	BQL	BQL	BQL
Carbon Tetrachloride	44	34	62	39	11	4	4
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	440	650	410	300	94	35	28
1,1 Dichloroethane	90	BQL	97	75	27	9	9
1,2 Dichloroethane	BQL	BQL	20	11	4	1	1
1,1 Dichloroethene	80	BQL	150	92	24	8	9
1,2 Dichloroethene	99	64	120	83	30	11	11
1,2 Dichloropropane	BQL	BQL	BQL	BQL	0.6 J	BQL	0.1 J
Ethylbenzene	BQL		BQL	BQL	BQL	BQL	BQL
Methylene Chloride	BQL	BQL	4 BJ	19 B	1 JB	2 B	0.2 JB
1,1,2,2 Tetrachloroethane	43	BQL	67	33	12	4	3
Tetrachloroethene	45	BQL	91	50	12	5	4
Toluene	BQL		BQL	BQL	BQL	0.2 J	BQL
1,1,1 Trichloroethane	44	BQL	50	27	5	2	1
1,1,2 Trichloroethane	BQL	BQL	BQL	3 J	1 J	BQL	0.4 J
Trichloroethene	58	BQL	54	38	11	4	4
Xylene (total)	BQL		BQL	BQL	BQL	BQL	BQL
2-Butanone			BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL
TOTAL VOCs	943	748	1143	770	233	85	75

Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

FINAL

# SCRDI - BLUFF ROAD

MW - 16B

## GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/l)	Aug 1997 Annual (ug/l)	Aug 1998 Annual (ug/l)	Sept 1999 Annual (ug/l)	Sept 2000 Annual (ug/l)	Sept 2001 Annual (ug/l)	Oct 2002 Annual (ug/l)
Acetone			52 BJ	BQL	BQL	BQL	BQL
Benzene	BQL		BQL	BQL	BQL	BQL	BQL
Carbon Tetrachloride	34	77	49	25	10	11	8
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	86	480	220	130	72	130	66
1,1 Dichloroethane	10	63	42	20	15	55	25
1,2 Dichloroethane	2	BQL	11 J	4 J	2 J	6	2
1,1 Dichloroethene	21	120	68	35	16	27	14
1,2 Dichloroethene	17	BQL	54	26	16	59	28
1,2 Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	0.3 J
Ethylbenzene	BQL		BQL	BQL	BQL	BQL	BQL
Methylene Chloride	BQL	BQL	BQL	1 JB	2 JB	8 B	7 B
1,1,2,2 Tetrachloroethane	13	48	37	16	9	11	5
Tetrachloroethene	18	64	43	23	8	9	6
Toluene	BQL		BQL	BQL	BQL	BQL	BQL
1,1,1 Trichloroethane	11	76	21 J	11	4	4 J	2
1,1,2 Trichloroethane	3	BQL	BQL	3 J	1 J	BQL	0.7
Trichloroethene	13	74	28	16	7	17	8
Xylene (total)	BQL		BQL	BQL	BQL	BQL	BQL
2-Butanone			BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL
<b>TOTAL VOCs</b>	<b>228</b>	<b>1002</b>	<b>625</b>	<b>310</b>	<b>162</b>	<b>337</b>	<b>172</b>

### Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

# SCRDI - BLUFF ROAD

MW - 17B

## GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/l)	Aug 1997 Annual (ug/l)	Aug 1998 Annual (ug/l)	Sept 1999 Annual (ug/l)	Sept 2000 Annual (ug/l)	Sept 2001 Annual (ug/l)	Oct 2002 Annual (ug/l)
Acetone			4 BJ	2 J	3 J	BQL	BQL
Benzene	BQL		BQL	BQL	BQL	BQL	BQL
Carbon Tetrachloride	4	BQL	0.2 J	0.3 J	BQL	0.2 J	0.6
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	22	1.2	1	0.7	0.3 J	0.5	0.5
1,1 Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1 Dichloroethane	2	BQL	0.2 J	0.2 J	BQL	0.2 J	0.2 J
1,2 Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	BQL		BQL	BQL	BQL	BQL	BQL
Methylene Chloride	BQL	BQL	0.1 BJ	BQL	0.2 JB	0.1 JB	0.1 JB
1,1,2,2 Tetrachloroethane	4	BQL	BQL	0.2 J	0.4 J	1	1
Tetrachloroethene	2	BQL	0.1 J	0.1 J	BQL	0.3 J	0.3 J
Toluene	BQL		BQL	BQL	BQL	BQL	BQL
1,1,1 Trichloroethane	2	BQL	BQL	BQL	BQL	BQL	BQL
1,1,2 Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Trichloroethene	3	BQL	0.2 J	0.2 J	0.1 J	0.5 J	0.6
Xylene (total)	BQL		BQL	BQL	BQL	BQL	BQL
2-Butanone			BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL
<b>TOTAL VOCs</b>	<b>39</b>	<b>1.2</b>	<b>5.8</b>	<b>3.7</b>	<b>4.0</b>	<b>2.8</b>	<b>3.3</b>

### Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample.  
It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

# SCRDI - BLUFF ROAD

MW - 18B

## GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/l)	Aug 1997 Annual (ug/l)	Aug 1998 Annual (ug/l)	Sept 1999 Annual (ug/l)	Sept 2000 Annual (ug/l)	Sept 2001 Annual (ug/l)	Oct 2002 Annual (ug/l)
Acetone			3 BJ	BQL	BQL	BQL	BQL
Benzene	BQL		BQL	BQL	BQL	BQL	BQL
Carbon Tetrachloride	13	4.0	0.4 J	0.1 J	BQL	BQL	0.1 J
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	17	3.2	0.9	0.2 J	0.1 J	0.2 J	0.1 J
1,1 Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1 Dichloroethene	3	2.0	0.3 J	BQL	BQL	BQL	BQL
1,2 Dichloroethene	0.6	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	BQL		BQL	BQL	BQL	BQL	BQL
Methylene Chloride	2	BQL	0.1 BJ	BQL	0.1 JB	0.3 JB	0.1 JB
1,1,2,2 Tetrachloroethane	4	BQL	0.3 J	BQL	BQL	BQL	BQL
Tetrachloroethene	BQL	1.1	0.2 J	BQL	BQL	BQL	BQL
Toluene	BQL		BQL	BQL	BQL	0.2 J	BQL
1,1,1 Trichloroethane	2	BQL	BQL	BQL	BQL	BQL	BQL
1,1,2 Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Trichloroethene	6	BQL	0.2 J	BQL	BQL	BQL	BQL
Xylene (total)	BQL		BQL	BQL	BQL	0.3 J	0.1 J
2-Butanone			BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL

TOTAL VOCs 47.6 10.3 5 0.3 0.2 1.0 0.4

### Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

SCRDI - BLUFF ROAD

MW - 19B

GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/l)	Aug 1997 Annual (ug/l)	Mar 1998 Semiannual (ug/l)	Aug 1998 Annual (ug/l)	Apr 1999 Semiannual (ug/l)	Sept 1999 Annual (ug/l)	Apr 2000 Semiannual (ug/l)	Sept 2000 Annual (ug/l)	Apr 2001 Semiannual (ug/l)	Sept 2001 Annual (ug/l)	May 2002 Semiannual (ug/l)	Oct 2002 Annual (ug/l)
Acetone			BQL	5 JB	0.5 JB	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Benzene	BQL		BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Carbon Tetrachloride	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1 Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1 Dichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	BQL		BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methylene Chloride	BQL	BQL	BQL	0.1 JB	0.1 JB	BQL	0.2 JB	0.1 JB	BQL	0.1 JB	BQL	BQL
1,1,2,2 Tetrachloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Tetrachloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Toluene	BQL		BQL	BQL	BQL	BQL	BQL	BQL	0.1 JB	BQL	0.2 J	BQL
1,1,1 Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1,2 Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Trichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Xylene (total)	BQL		BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.4 J	0.1 J
2-Butanone			BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
TOTAL VOCs	BQL	BQL	0.6	5.1	0.6	BQL	0.2	0.1	0.1	0.1	0.6	0.1

Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

D - This flag indicates compounds identified at a secondary dilution factor

SCRDI - BLUFF ROAD

MW - 20B

GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/l)	Aug 1997 Annual (ug/l)	Mar 1998 Semiannual (ug/l)	Aug 1998 Annual (ug/l)	Apr 1999 Semiannual (ug/l)	Sept 1999 Annual (ug/l)	Apr 2000 Semiannual (ug/l)	Sept 2000 Annual (ug/l)	Apr 2001 Semiannual (ug/l)	Sept 2001 Annual (ug/l)	May 2002 Semiannual (ug/l)	Oct 2002 Annual (ug/l)
Acetone			BQL	2 JB	1 JB	BQL	5 J	BQL	5 J	BQL	BQL	BQL
Benzene	BQL		BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Carbon Tetrachloride	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1-Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2-Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1-Dichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2-Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2-Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methylene Chloride	BQL	BQL	BQL	0.1 JB	0.1 JB	BQL	0.1 JB	0.2 JB	0.1	0.4 JB	BQL	0.1 JB
1,1,2,2-Tetrachloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Tetrachloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Toluene	BQL		BQL	BQL	BQL	BQL	BQL	BQL	0.2 J	BQL	0.1 J	BQL
1,1,1-Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1,2-Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Trichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Xylene (total)	BQL		BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.2 J	BQL
2-Butanone			BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
TOTAL VOCs	BQL	BQL	BQL	2	1	BQL	5	0.2	5.3	0.4	0.3	0.1

Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

D - This flag indicates compounds identified at a secondary dilution factor

SCRDI - BLUFF ROAD

MW - 21B

GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/l)	Aug 1997 Annual (ug/l)	Mar 1998 Semiannual (ug/l)	Aug 1998 Annual (ug/l)	Apr 1999 Semiannual (ug/l)	Sept 1999 Annual (ug/l)	Apr 2000 Semiannual (ug/l)	Sept 2000 Annual (ug/l)	Apr 2001 Semiannual (ug/l)	Sept 2001 Annual (ug/l)	May 2002 Semiannual (ug/l)	Oct 2002 Annual (ug/l)
Acetone			BQL	3 BJ	2 BJ	1 J	4 J	3 J	BQL	BQL	BQL	BQL
Benzene	BQL		BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Carbon Tetrachloride	11	4.4	8	8	8	8	8	4	3	2	1	0.7
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	10	BQL	3	2	0.9	0.6	0.6	0.5 J	0.4 J	0.3 J	0.2 J	0.2 J
1,1 Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1 Dichloroethane	2	BQL	0.8	0.8	0.5 J	0.4 J	0.4 J	0.3 J	0.2 J	BQL	BQL	BQL
1,2 Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2 Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methylene Chloride	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.2 JB	BQL	0.3 JB	BQL	0.1 JB
1,1,2,2 Tetrachloroethane	3	BQL	4	4	3	3	3	3	2	1	0.5 J	BQL
Tetrachloroethane	1	BQL	0.8	0.8	0.4 J	0.4 J	0.5 J	0.3 J	0.2 J	0.1 J	BQL	BQL
Toluene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.5 J	BQL	0.1 J	0.2 J
1,1,1 Trichloroethane	2	BQL	BQL	0.2 J	0.2 J	0.1 J	0.1 J	BQL	BQL	BQL	BQL	BQL
1,1,2 Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Trichloroethane	2	BQL	2	1	1	1	1	0.8	0.6	0.4 J	0.2 J	0.1 J
Xylene (total)	BQL		BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.3 J	0.2 J
2-Butanone			BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
TOTAL VOCs	31	4.4	18.6	18	14	12.5	16	12	7	4	2	2

Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample.  
It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

D - This flag indicates compounds identified at a secondary dilution factor



SCRDI - BLUFF ROAD

MW - 22B

GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/l)	Aug 1997 Annual (ug/l)	Mar 1998 Semiannual (ug/l)	Aug 1998 Annual (ug/l)	Apr 1999 Semiannual (ug/l)	Sept 1999 Annual (ug/l)	Apr 1999 Semiannual (ug/l)	Sept 2000 Annual (ug/l)	Apr 2001 Semiannual (ug/l)	Sept 2001 Annual (ug/l)	May 2002 Semiannual (ug/l)	Oct 2002 Annual (ug/l)
Acetone			BQL	40 BJ	2 BJ	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Benzene	BQL		BQL	7 J	5 J	2 J	2	1 J	2 JD	2 J	3 J	2 J
Carbon Tetrachloride	14	97	80	70	74	43	22	11	12	10	6	6
Chlorobenzene	BQL	BQL	BQL	3 J	BQL	BQL	BQL	0.6 J	0.7	1	1 J	BQL
Chloroform	2	280	430	310	390	250	180 D	08	78 D	55	36	31
1,1 Dichloroethane	BQL	35	75	77	80	88	98 D	71	100 D	81	81	58
1,2 Dichloroethane	BQL	42	50	43	59	31	25	16	14 D	15	14	12
1,1 Dichloroethene	1	69	130	130	110	120	110 D	68	84 D	48	01	53
1,2 Dichloroethene	BQL	BQL	BQL	150	200	180	190 D	140	190 D	140	180	150
1,2 Dichloropropane	BQL	BQL	BQL	BQL	1	BQL	1	1 J	1	0.7	BQL	BQL
Ethylbenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methylene Chloride	BQL	BQL	BQL	12 B	12 BJ	4 JB	5 BJ	2 JB	3 BJ	17 B	17 B	26 B
1,1,2,2 Tetrachloroethane	BQL	84	84	83	83	46	36 D	23	14 D	12	7	7
Tetrachloroethene	7	110	140	120	98	92	60 D	32	20 D	20	14	12
Toluene	BQL		BQL	BQL	BQL	BQL	BQL	BQL	0.2 J	0.1 J	BQL	BQL
1,1,1 Trichloroethane	1	37	45	35	39	36	28 D	13	12 D	8	6	4 J
1,1,2 Trichloroethane	0.5	BQL	BQL	BQL	BQL	4 J	BQL	2 J	1	1	BQL	BQL
Trichloroethene	BQL	09	130	99	110	90	64 D	33	28 D	17	13	11
Xylene (total)	BQL		BQL	BQL	BQL	BQL	0.09 J	BQL	0.1 J	0.2 J	BQL	BQL
2-Butanone			BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
<b>TOTAL VOCs</b>	<b>25.5</b>	<b>823</b>	<b>1170</b>	<b>1179</b>	<b>1269</b>	<b>988</b>	<b>813</b>	<b>512</b>	<b>569</b>	<b>428</b>	<b>439</b>	<b>372</b>

Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

It indicates possible/probable blank contamination:

J - This flag indicates an estimated value.

D - This flag indicates compounds identified at a secondary dilution factor

# SCRDI - BLUFF ROAD

MW - 23B

## GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/l)	Aug 1997 Annual (ug/l)	Aug 1998 Annual (ug/l)	Sept 1999 Annual (ug/l)	Sept 2000 Annual (ug/l)	Sept 2001 Annual (ug/l)	Oct 2002 Annual (ug/l)
Acetone			6 BJ	BQL	22 J	BQL	BQL
Benzene	BQL		2 J	1	6	0.9	0.6
Carbon Tetrachloride	110	BQL	3	3	7	1	0.8
Chlorobenzene	BQL	BQL	0.8 J	0.8 J	3	0.5 J	0.3 J
Chloroform	1500	680	53	39	120	18	10
1,1 Dichloroethane	2	BQL	20	17	84	17	12
1,2 Dichloroethane	BQL	BQL	4	4	12	3	3
1,1 Dichloroethene	190	180	21	18	82	13	10
1,2 Dichloroethene	77	BQL	23	22	100	22	16
1,2 Dichloropropane	BQL	160	BQL	0.4 J	1 J	0.3 J	0.2 J
Ethylbenzene	BQL		BQL	BQL	BQL	BQL	BQL
Methylene Chloride	230	BQL	4 B	0.6 JB	6 B	0.3 JB	0.4 JB
1,1,2,2 Tetrachloroethane	150	BQL	9	7	18	4	3
Tetrachloroethene	200	130	12	10	28	7	7
Toluene	BQL		BQL	BQL	BQL	0.1 J	BQL
1,1,1 Trichloroethane	130	100	6	5	13	2	1
1,1,2 Trichloroethane	BQL	BQL	BQL	0.5 J	1 J	BQL	0.4 J
Trichloroethene	220	190	13	10	30	6	5
Xylene (total)	BQL		BQL	BQL	0.5 J	0.1 J	0.2 J
2-Butanone			5 J	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL
<b>TOTAL VOCs</b>	<b>2809</b>	<b>1440</b>	<b>182</b>	<b>138</b>	<b>534</b>	<b>95</b>	<b>70</b>

### Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample.  
It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

SCRDI - BLUFF ROAD

MW - 24B

GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/l)	Aug 1997 Annual (ug/l)	Aug 1998 Annual (ug/l)	Sept 1999 Annual (ug/l)	Sept 2000 Annual (ug/l)	Sept 2001 Annual (ug/l)	Oct 2002 Annual (ug/l)
Acetone			5 B	BQL	2 J	BQL	BQL
Benzene	BQL		BQL	BQL	BQL	0.3 J	BQL
Carbon Tetrachloride	BQL	BQL	BQL	8	9	51	67 D
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	0.1 J	BQL
Chloroform	BQL	BQL	0.2 J	20	20	210	360 D
1,1 Dichloroethane	BQL	BQL	BQL	0.3 J	0.4 J	3	6
1,2 Dichloroethane	BQL	BQL	BQL	0.3 J	0.3 J	3	5 J
1,1 Dichloroethene	BQL	BQL	0.3 J	4	4	24	51
1,2 Dichloroethene	BQL	BQL	BQL	0.3 J	0.4 J	4	8
1,2 Dichloropropane	BQL	BQL	BQL	BQL	BQL	0.5 J	BQL
Ethylbenzene	BQL		BQL	BQL	BQL	BQL	BQL
Methylene Chloride	0.6	BQL	0.1 BJ	BQL	0.1 JB	8 B	21 B
1,1,2,2 Tetrachloroethane	BQL	BQL	BQL	5	5	34	38
Tetrachloroethene	BQL	BQL	BQL	2	2	22	43 D
Toluene	BQL		BQL	BQL	BQL	BQL	BQL
1,1,1 Trichloroethane	BQL	BQL	BQL	1	1	9	13 D
1,1,2 Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Trichloroethene	BQL	BQL	BQL	4	4	29	57 D
Xylene (total)	BQL		BQL	BQL	BQL	BQL	BQL
2-Butanone			BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL
<b>TOTAL VOCs</b>	<b>0.6</b>	<b>BQL</b>	<b>6</b>	<b>45</b>	<b>48</b>	<b>398</b>	<b>669</b>

Notes:

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.  
It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

SCRDI - BLUFF ROAD

MW - 25B

GROUNDWATER ANALYTICAL DATA

Compound	Jun 1996 Baseline (ug/l)	Aug 1997 Annual (ug/l)	Aug 1998 Annual (ug/l)	Sept 1999 Annual (ug/l)	Sept 2000 Annual (ug/l)	Sept 2001 Annual (ug/l)	Oct 2002 Annual (ug/l)
Acetone			77 BJ	BQL	23 JD	BQL	BQL
Benzene	BQL		BQL	BQL	BQL	BQL	BQL
Carbon Tetrachloride	600	BQL	100	57	29 D	11	8
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	1800	1300	1000	440	160 D	42	46
1,1 Dichloroethane	BQL	BQL	59	17	6 D	1 J	2 J
1,2 Dichloroethane	83	BQL	20 J	9 J	3 JD	1 J	1 J
1,1 Dichloroethene	290	160	200	55	25 D	6	6
1,2 Dichloroethene	BQL	BQL	61	22	7 D	2 J	2 J
1,2 Dichloropropane	BQL	350	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	BQL		BQL	BQL	BQL	BQL	BQL
Methylene Chloride	BQL	BQL	42 BJ	3 JB	12 BD	11 B	13 B
1,1,2,2 Tetrachloroethane	220	130	100	54	23 D	8	6
Tetrachloroethane	270	180	140	46	17 D	6	5
Toluene	BQL		BQL	BQL	BQL	BQL	BQL
1,1,1 Trichloroethane	190	130	79	24	8 D	2 J	1 J
1,1,2 Trichloroethane	BQL	BQL	BQL	3 J	0.7 J	BQL	BQL
Trichloroethene	250	180	140	54	19 D	6	6
Xylene (total)	BQL		BQL	BQL	BQL	BQL	BQL
2-Butanone			BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone			BQL	BQL	BQL	BQL	BQL
<b>TOTAL VOCs</b>	<b>3703</b>	<b>2430</b>	<b>2018</b>	<b>784</b>	<b>333</b>	<b>96</b>	<b>96</b>

Notes

Refer to O&M Plan, Section 5.0, for periodic remedial action monitoring

Baseline (pre-remedial) sampling June 11 - 14, 1996

BQL - below quantitation limits

B - This flag is used when the analyte is found in the associated blank as well as in the sample.  
It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

D - This flag indicates compounds identified at a secondary dilution factor

SCRDI - BLUFF ROAD

RECOVERY WELL ANALYTICAL DATA SUMMARY

RW - 1

Location RW - 1														
Sampling Date PARAMETER	Aug 8 1996	Aug 29 1996	Jan 29 1997	Aug 12 1997	Mar 25 1998	Aug 25 1998	Apr 26 1999	Sept 28 1999	Apr 11 2000	Sept 27 2000	Apr 10 2001	Sept 27 2001	May 1 2002	Oct 2 2002
<b>TCL VOLATILES (ug/L)</b>														
Acetone	BQL	BQL	NR	NR	NR	6 BJ	1 J	1 J	BQL	BQL	BQL	BQL	BQL	BQL
Benzene	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Carbon tetrachloride	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	BQL	BQL	BQL	BQL	BQL	BQL	0.4 J	0.2 J	0.2 J	BQL	0.4 J	BQL	0.1 J	BQL
1,1-Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2-Dichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1-Dichloroethene	BQL	BQL	14	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,2-Dichloroethene (Total)	BQL	BQL	79	BQL	BQL	BQL	BQL	0.1 J	BQL	BQL	0.4 J	BQL	0.1 J	BQL
1,2-Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methylene chloride	BQL	BQL	BQL	BQL	BQL	4 BJ	0.1 BJ	BQL	BQL	0.1	0.3 JB	BQL	0.3 JB	BQL
1,1,2,2-Tetrachloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.1 J	BQL
Tetrachloroethene	BQL	BQL	BQL	BQL	BQL	BQL	0.2 J	BQL	BQL	BQL	0.8	BQL	0.9	0.3 J
Toluene	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	0.3 J	BQL	BQL	BQL
1,1,1-Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1,2-Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Trichloroethene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Xylene (Total)	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2-Butanone	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
<b>TOTAL VOCs</b>	<b>BQL</b>	<b>BQL</b>	<b>93</b>	<b>BQL</b>	<b>BQL</b>	<b>10</b>	<b>2</b>	<b>1.3</b>	<b>0.2</b>	<b>0.1</b>	<b>2</b>	<b>BQL</b>	<b>1.5</b>	<b>0.3</b>

NOTES

BQL = Below Quantitation Limit

NS = Not Sampled

NR = Not Reported

All results reported ug/L

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

J - Indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

FINAL

SCRDI - BLUFF ROAD

RECOVERY WELL ANALYTICAL DATA SUMMARY

RW - 2

Location	RW - 2													
Sampling Date	Aug 8	Aug 29	Jan 29	Aug 12	Mar 25	Aug 25	Apr 26	Sept 28	Apr 11	Sept 27	Apr 10	Sept 27	May 1	Oct 2
PARAMETER	1996	1996	1997	1997	1998	1998	1999	1999	2000	2000	2001	2001	2002	2002
<b>TCL VOLATILES (ug/L)</b>														
Acetone	BQL	BQL	NR	NR	NR	32.6	NS	BQL	BQL	41 J	BQL	BQL	BQL	BQL
Benzene	BQL	BQL	NR	NR	NR	13	NS	15	15	7	6 D	7	5	5
Carbon tetrachloride	5.3	BQL	BQL	BQL	BQL	BQL	NS	BQL	BQL	BQL	1 J D	0.9 J	0.8 J	0.7 J
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	12	NS	23	15	11	8 D	6	3	3 J
Chloroform	3.5	BQL	BQL	BQL	16	6 J	NS	11	6 J	6	5 J D	4 J	4	5 J
1,1-Dichloroethane	0.6	18	55	84	180	61	NS	100	59	29	35 D	33	16	21
1,2-Dichloroethane	BQL	BQL	BQL	BQL	24	6 J	NS	7 J	5 J	4 J	4 J D	4 J	4	3 J
1,1-Dichloroethene	1.2	16	74	110	130	78	NS	89	69	49	34 D	34	21	22
1,2-Dichloroethene (Total)	17	240	494	BQL	54	320	NS	310	290	210	150 D	150	92	120
1,2-Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	NS	BQL	BQL	BQL	0.3 J	BQL	BQL	BQL
Ethylbenzene	BQL	BQL	NR	NR	NR	5 J	NS	7 J	6 J	3 J	2	3 J	1 J	1 J
Methylene chloride	BQL	BQL	BQL	BQL	BQL	7 B J	NS	BQL	7 J B	12 B	2 J B	22 B	4 B	9 B
1,1,2,2-Tetrachloroethane	2	BQL	BQL	BQL	BQL	BQL	NS	BQL	BQL	BQL	1	2 J	2 J	BQL
Tetrachloroethene	5.9	BQL	BQL	BQL	BQL	BQL	NS	3 J	5 J	2 J	2	3 J	3	2 J
Toluene	BQL	14	NR	NR	NR	51	NS	22	27	6	2 J D	3 J	1 J	1 J
1,1,1-Trichloroethane	0.6	BQL	BQL	BQL	BQL	2 J	NS	2 J	3 J	BQL	2 J D	2 J	0.9 J	0.9 J
1,1,2-Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	NS	BQL	BQL	BQL	0.4 J	BQL	BQL	BQL
Trichloroethene	1.6	BQL	BQL	BQL	BQL	BQL	NS	BQL	3 J	2 J	1 J D	2 J	2 J	2 J
Xylene (Total)	BQL	BQL	NR	NR	NR	10 J	NS	16	12	6	2	4 J	1 J	1 J
2-Butanone	BQL	BQL	NR	NR	NR	BQL	NS	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl 2-Pentanone	BQL	BQL	NR	NR	NR	BQL	NS	BQL	BQL	BQL	BQL	BQL	BQL	BQL
<b>TOTAL VOCs</b>	<b>38</b>	<b>280</b>	<b>623</b>	<b>194</b>	<b>404</b>	<b>603</b>	<b>NS</b>	<b>605</b>	<b>542</b>	<b>390</b>	<b>256</b>	<b>280</b>	<b>161</b>	<b>197</b>

NOTES

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NS = Not Sampled

NR = Not reported

All results reported ug/L

B - This flag is used when the analyte is found in the associated blank as well as in the sample.  
It indicates possible/probable blank contamination.

J - This flag indicates an estimated value

FINAL

SCRDI - BLUFF ROAD

RECOVERY WELL ANALYTICAL DATA SUMMARY

RW - 3

Location RW - 3															
Sampling Date PARAMETER	Aug 8 1998	Aug 29 1996	Jan 29 1997	Aug 12 1997	Mar 25 1998	Aug 25 1998	Aug 26 1998	Apr 26 1999	Sept 28 1999	Apr 11 2000	Sept 27 2000	Apr 10 2001	Sept 27 2001	May 1 2002	Oct 2 2002
<b>TCL VOLATILES (ug/L)</b>															
Acetone	BQL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Benzene	54	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Carbon tetrachloride	BQL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Chlorobenzene	48	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Chloroform	BQL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1,1-Dichloroethane	620	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1,2-Dichloroethane	33	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1,1-Dichloroethene	350	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1,2-Dichloroethene (Total)	960	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1,2-Dichloropropane	BQL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Ethylbenzene	BQL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Methylene chloride	BQL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1,1,2,2-Tetrachloroethane	BQL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Tetrachloroethene	BQL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Toluene	340	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1,1,1-Trichloroethane	BQL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1,1,2-Trichloroethane	BQL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Trichloroethane	BQL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Xylene (Total)	44	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2-Butanone	BQL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
4-Methyl-2-Pentanone	BQL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
<b>TOTAL VOCs</b>	<b>2449</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>

NOTES

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NS = Not Sampled

NR = Not reported

All results reported ug/L

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

U - Indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

FINAL

SCRDI - BLUFF ROAD

RECOVERY WELL ANALYTICAL DATA SUMMARY

RW - 4

Location RW - 4														
Sampling Date PARAMETER	Aug 8 1996	Aug 29 1996	Jan 23 1997	Aug 12 1997	Mar 25 1998	Aug 25 1998	Apr 26 1999	Sept 28 1999	Apr 11 2000	Sept 27 2000	Apr 10 2001	Sept 27 2001	May 1 2002	Oct 2 2002
<b>TCL VOLATILES (ug/L)</b>														
Acetone	BQL	BQL	NR	NR	NR	28 BJ	72 BJ	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Benzene	BQL	19	NR	NR	NR	13 J	15 J	12	8 J	8 J	5	4 J	2 J	2 J
Carbon tetrachloride	51	48	27	34	40	8 J	21	17	14	12	10 D	10	6	7
Chlorobenzene	BQL	15	BQL	BQL	BQL	7 J	6 J	5 J	4 J	3 J	2	BQL	BQL	0.9 J
Chloroform	170	200	220	200	170	94	130	110	100	84	74 D	63	44	50
1,1-Dichloroethane	160	250	330	420	380	230	270	220	180	160	120 D	110	73	82
1,2-Dichloroethane	26	36	50	57	73	25 J	31	27	21	17	13 D	13	8	7
1,1-Dichloroethylene	130	240	190	270	250	160	250	170	130	120	90 D	75	53	60
1,2-Dichloroethane (Total)	260	440	452	BQL	46	470	460	400	290	260	200 D	180	120	130
1,2-Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	3 J	3 J	2 J	BQL	1	BQL	BQL	BQL
Ethylbenzene	BQL	BQL	NR	NR	NR	BQL	3 J	3 J	2 J	BQL	1	BQL	BQL	BQL
Methylcyclohexane	BQL	13	BQL	BQL	BQL	17 BJ	13 BJ	4 JB	5 JB	8 JB	3 JB	16 B	22 B	8 B
1,1,2,2-Tetrachloroethane	49	76	53	UOL	BQL	15 J	20	20	15	16	9 D	10	7	7
Tetrachloroethene	31	94	56	52	BQL	24 J	33	27	22	20	15 D	16	11	13
Toluene	BQL	11	NS	NR	NR	6 J	5 J	4 J	2 J	BQL	1	0.5 J	BQL	BQL
1,1,1-Trichloroethane	48	65	64	56	48	15 J	19 J	12	11	7 J	5	5 J	3 J	3 J
1,1,2-Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	0.6	BQL	BQL	BQL
Trichloroethylene	28	55	59	58	40	20 J	28	24	21	18	16 D	16	13	16
Xylene (Total)	BQL	BQL	NR	NR	NR	6 J	9 J	8 J	5 J	2 J	3	2 J	BQL	1 J
2-Butanone	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
<b>TOTAL VOCs</b>	<b>955</b>	<b>1562</b>	<b>1501</b>	<b>1143</b>	<b>1047</b>	<b>1136</b>	<b>1388</b>	<b>1066</b>	<b>832</b>	<b>735</b>	<b>569</b>	<b>521</b>	<b>362</b>	<b>386</b>

NOTES

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All results reported ug/L

G - This flag is used when the analyte is found in the associated blank as well as in the sample.  
It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

FINAL



SCRDI - BLUFF ROAD

RECOVERY WELL ANALYTICAL DATA SUMMARY

RW - 5

Location RW - 5														
Sampling Date PARAMETER	Aug 8 1996	Aug 29 1996	Jan 29 1997	Aug 12 1997	Mar 25 1998	Aug 25 1998	Apr 26 1999	Sept 28 1999	Apr 11 2000	Sept 27 2000	Apr 12 2001	Sept 27 2001	May 1 2002	Oct 2 2002
<b>TCL VOLATILES (ug/L)</b>														
Acetone	BQL	BQL	NR	NR	NR	52 B	70 BJ	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Benzene	42	48	NR	NR	NR	17 J	13 J	11	9 J	6 J	3 JD	4 J	2 J	1 J
Carbon tetrachloride	BQL	28	64	53	80	31	51	42	27	27	22 D	17	11	12
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	4 J	BQL	BQL	BQL	BQL	BQL
Chloroform	430	940	730	580	710	380	430	300	230	180	130 D	110	75	74
1,1-Dichloroethane	900	730	390	390	650	440	320	250	240	180	98 D	110	60	47
1,2-Dichloroethane	46	42	84	85	98	27	31	26	26	25	15 D	16	9	6
1,1-Dichloroethene	480	470	190	200	60	280	240	170	160	130	79 D	71	47	35
1,2-Dichloroethene (Total)	710	770	420	BQL	BQL	800	440	360	360	270	160 D	160	92	71
1,2-Dichloropropane	BQL	BQL	BQL	BQL	BQL	BQL	4 J	3 J	2 J	2 J	1 JD	BQL	BQL	BQL
Ethylbenzene	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	2 J	BQL	BQL	BQL	BQL	BQL
Methylene chloride	BQL	37	BQL	BQL	BQL	65 B	17 BJ	3 BJ	6 BJ	9 BJ	3 JBD	15 B	14 B	7 B
1,1,2,2-Tetrachloroethane	BQL	94	51	55	64	38	50	40	15	25	18 D	15	10	9
Tetrachloroethane	34	130	84	72	100	58	68	56	22	32	28 D	24	17	16
Toluene	100	98	NR	NR	NR	7 J	2 J	BQL	2 J	BQL	BQL	BQL	BQL	BQL
1,1,1-Trichloroethane	100	120	110	60	100	31	31	20	17	11	8 D	6	4 J	3 J
1,1,2-Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	8 J	8 J	BQL	4 J	3 JD	BQL	2 J	1 J
Trichloroethene	78	210	180	130	200	89	120	88	64	53	40 D	32	24	22
Xylene (Total)	BQL	36	NR	NR	NR	8 J	2 J	BQL	5 J	BQL	BQL	BQL	BQL	BQL
2-Butanone	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
<b>TOTAL VOCs</b>	<b>2020</b>	<b>3753</b>	<b>2283</b>	<b>1811</b>	<b>2002</b>	<b>2121</b>	<b>1897</b>	<b>1373</b>	<b>1191</b>	<b>954</b>	<b>608</b>	<b>580</b>	<b>367</b>	<b>304</b>

NOTES

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All results reported ug/L

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It indicates possible/probable blank contamination.

J - This flag indicates an estimated value.

D - This flag indicates compounds identified at a secondary dilution factor

FINAL

## SCRDI - BLUFF ROAD

## RECOVERY WELL ANALYTICAL DATA SUMMARY

RW - 6

Location RW - 6														
Sampling Date PARAMETER	Aug 8 1996	Aug 29 1996	Jan 29 1997	Aug 12 1997	Mar 25 1998	Aug 25 1998	Apr 26 1999	Sept 28 1999	Apr 11 2000	Sept 27 2000	Apr 10 2001	Sept 27 2001	May 1 2002	Oct 2 2002
<b>TCL VOLATILES (ug/L)</b>														
Acetone	BQL	BQL	NR	NR	NR	BQL	150 BJ	BQL	BQL	190 J	BQL	BQL	BQL	BQL
Benzene	BQL	BQL	NR	NR	NR	BQL	BQL	34 J	6 JD	5 J	3 JD	3 J	3 J	3 J
Carbon tetrachloride	64	150	130	160	150	140	210	210	120 D	98	74 D	68	45	49
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	1 J	BQL	1 J
Chloroform	64	160	580	820	920	880	1100	1200	790 D	700	470 D	360	300	300
1,1-Dichloroethane	BQL	5.1	37	78	70	95	160	220	120 D	140	110 D	98	88	82
1,2-Dichloroethane	6.7	15	BQL	99	85	31	44 J	46 J	30 D	26	18 D	16	13	13
1,1-Dichloroethene	22	57	97	130	250	160	300	360	200	210	200	110	100	94
1,2-Dichloroethene (Total)	4.5	10	27	BQL	BQL	120	190	250	150 D	100	130 D	130	110	120
1,2-Dichloropropene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	2 JD	BQL	BQL	2 J
Ethylbenzene	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methylene chloride	BQL	BQL	BQL	BQL	BQL	11 JB	30 BJ	13 JB	61 BD	81 D	6 JBD	14 B	29 B	33 B
1,1,2,2-Tetrachloroethane	11	39	67	72	60	84	96	120	71 D	75	42 D	38	29	24
Tetrachloroethene	8.7	56	120	130	170	170	210	240	140 D	110	82 D	75	57	60
Toluene	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	10 JD	BQL	BQL	BQL	BQL	BQL
1,1,1-Trichloroethane	11	25	80	120	120	83	110	110	65 D	50	31 D	26	17	17
1,1,2-Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	6 J	BQL	BQL	BQL	3 J
Trichloroethene	6.5	30	98	180	170	150	200	250	140 D	110	81 D	73	61	68
Xylene (Total)	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	6 JD	BQL	BQL	BQL	BQL	BQL
2-Butanone	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
<b>TOTAL VOCs</b>	<b>198</b>	<b>547</b>	<b>1236</b>	<b>1789</b>	<b>1095</b>	<b>1924</b>	<b>2800</b>	<b>3053</b>	<b>1899</b>	<b>1941</b>	<b>1259</b>	<b>1012</b>	<b>852</b>	<b>869</b>

## NOTES

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D - This flag indicates compounds identified at a secondary dilution factor.

FINAL

SCRDI - BLUFF ROAD

RECOVERY WELL ANALYTICAL DATA SUMMARY

RW-8

Location RW - 8														
Sampling Date PARAMETER	Aug 8 1996	Aug 29 1996	Jan 29 1997	Aug 12 1997	Mar 25 1998	Aug 25 1998	Apr 26 1999	Sept 28 1999	Apr 11 2000	Sept 27 2000	Apr 10 2001	Sept 27 2001	May 1 2002	Oct 2 2002
<b>TCL VOLATILES (ug/L)</b>														
Acetone	BQL	BQL	NR	NR	NR	BQL	67 JB	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Benzene	BQL	BQL	NR	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Carbon tetrachloride	88	130	52	140	120	48	80	66	80	55	45 D	57	33	41
Chlorobenzene	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Chloroform	450	460	270	440	600	310	360	280	330	230	190 D	180	110	100
1,1-Dichloroethane	BQL	BQL	BQL	BQL	BQL	5 J	7 J	6 J	6 J	6 J	5 JD	5 J	3 J	2 J
1,2-Dichloroethane	BQL	BQL	BQL	BQL	76	6 J	8 J	6 J	6 J	4 J	3 JD	4 J	3 J	3 J
1,1-Dichloroethene	64	94	36	84	84	49	71	51	52	44	33 D	32	20	20
1,2-Dichloroethene (Total)	BQL	BQL	BQL	BQL	BQL	6 J	8 J	7 J	7 J	6 J	5 JD	6	3 J	3 J
1,2-Dichloropropane	BQL	BQL	BQL	43	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Ethylbenzene	BQL	BQL	NR	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Methylene chloride	BQL	BQL	BQL	BQL	BQL	7 BJ	12 JB	3 JB	6 JB	8 JB	3 JBD	15 B	8	15 B
1,1,2,2-Tetrachloroethane	50	67	25	83	49	26	34	33	39	29	19 D	23	14	11
Tetrachloroethene	BQL	69	32	80	75	44	51	42	44	32	25 D	27	17	20
Toluene	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
1,1,1-Trichloroethane	42	49	31	66	84	23	28	19	21	14	10 D	9	5 J	5 J
1,1,2-Trichloroethane	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Trichloroethene	34	68	38	68	150	42	52	43	49	32	28 D	27	17	19
Xylene (Total)	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
2-Butanone	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
4-Methyl-2-Pentanone	BQL	BQL	NR	NR	NR	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
<b>TOTAL VOCs</b>	<b>728</b>	<b>935</b>	<b>484</b>	<b>1006</b>	<b>1238</b>	<b>566</b>	<b>778</b>	<b>556</b>	<b>640</b>	<b>460</b>	<b>366</b>	<b>385</b>	<b>231</b>	<b>239</b>

NOTES

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FINAL

**ATTACHMENT D**  
**Site Visit and Contact Information**

FINAL

**ATTACHMENT D**  
**Site Visit and Contact Information**

**5-Year Review Site Visit**  
**Date: 18 June 2002**  
**Location: Bluff Road SCRDI Site**  
**Columbia, Richland County, SC**

<b>ATTENDEES</b>				
<b>Name/Title</b>	<b>Organization</b>	<b>Address</b>	<b>Phone</b>	<b>Fax</b>
Mitch Hall, P.G.	USACE, Charleston	69-A Hagood Ave Charleston SC 29403	843-329-8155	843-329-2330
Dante Agulto	USACE, TAC	P.O. Box 2250 Winchester, VA 22604	540-665-3990	540-665-3628
John P. Stiles, P.E.	de maximis, inc.	450 Montbrook Lane Knoxville, TN	865-691-5052	865-691-6485
Dan Garrigan	O & M, Inc.	450 Montbrook Lane Knoxville, TN	865-691-6254	865-691-9595
Scott Ingles	O & M, Inc.	431 Windy Cove Lane Ridgeway, SC 29130	Cell 803-530- 5090	803-714-1713

**5-Year Review Site Visit**  
**Date: 14 November 2002**  
**Location: Bluff Road SCRDI Site**  
**Columbia, Richland County, SC**

<b>ATTENDEES</b>				
<b>Name/Title</b>	<b>Organization</b>	<b>Address</b>	<b>Phone</b>	<b>Fax</b>
Mitch Hall, P.G.	USACE, Charleston	69-A Hagood Ave Charleston SC 29403	843-329-8155	843-329-2330
Kenneth See, P.E.	USACE, Charleston	69-A Hagood Ave Charleston SC 29403	843-329-8059	843-329-2330
John P. Stiles, P.E.	de maximis, inc.	450 Montbrook Lane Knoxville, TN	865-691-5052	865-691-6485
Dan Garrigan	O & M, Inc.	450 Montbrook Lane Knoxville, TN	865-691-6254	865-691-9595
Scott Ingles	O & M, Inc.	431 Windy Cove Lane Ridgeway, SC 29130	Cell 803-530- 5090	803-714-1713

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**ATTACHMENT E**  
**12 November 2002 Weekly Checklist**

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## WEEKLY INSPECTION CHECKLIST SCRDI-BLUFF ROAD SITE COLUMBIA, SOUTH CAROLINA

DATE: 11/12/02

TIME IN: 0800 TIME OUT: 1600

WEATHER CONDITIONS: overcast rain

APPROXIMATE TEMPERATURE: 57°

NAME/OPERATOR: James S. Ingles

SIGNATURE: [Signature]

CERTIFICATION #: 05525

### Well Recovery Information

ITEM	PUMP OPERATIONAL (Yes/No)	NORMAL CONDITION	FLOW RATE (gpm)	TOTAL FLOW (gpm)
RW-1 (FQI-1)	<u>Y</u>	15 to 25 gpm	<u>12</u>	<u>22614284</u>
RW-2 (FQI-2)	<u>Y</u>	20 to 25 gpm	<u>23</u>	<u>47811166</u>
RW-3 (FQI-3)	<u>N</u>	20 to 25 gpm	<u>0</u>	<u>178648</u>
RW-4 (FQI-4)	<u>Y</u>	10 to 20 gpm	<u>16</u>	<u>50298541</u>
RW-5 (FQI-5)	<u>Y</u>	20 to 25 gpm	<u>26</u>	<u>55909630</u>
RW-6 (FQI-6)	<u>Y</u>	40 to 50 gpm	<u>35</u>	<u>97164236</u>
RW-7 (FQI-7)	<u>Y</u>	5 to 10 gpm	<u>8</u>	<u>17197773</u>
RW-8 (FQI-8)	<u>Y</u>	5 to 10 gpm	<u>18</u>	<u>39446005</u>

### Well Injection Information

ITEM	NORMAL CONDITION	FLOW RATE (gpm)	TOTAL FLOW (gpm)	PRESSURE READING PSI
IW-1 (FQI-23)	0 to 3 gpm	<u>9</u>	<u>22268219</u>	<u>7</u>
IW-2 (FQI-25)	0 to 8 gpm	<u>22</u>	<u>32650580</u>	<u>4</u>
IW-3 (FQI-27)	0 to 8 gpm	<u>15</u>	<u>32133221</u>	<u>6</u>
IW-4 (FQI-29)	0 to 8 gpm	<u>15</u>	<u>29453749</u>	<u>5.5</u>
IW-5 (FQI-31)	15 to 20 gpm	<u>13</u>	<u>36466184</u>	<u>6</u>
IW-6 (FQI-33)	25 to 35 gpm	<u>13</u>	<u>40719276</u>	<u>6</u>
IW-7 (FQI-35)	15 to 25 gpm	<u>17</u>	<u>42229989</u>	<u>6</u>
IW-8 (FQI-37)	20 to 30 gpm	<u>16</u>	<u>37416189</u>	<u>4</u>
IW-9 (FQI-39)	30 to 45 gpm	<u>9</u>	<u>37946963</u>	<u>5.5</u>
IW-10 (FQI-41)	10 to 12 gpm	<u>14</u>	<u>25546583</u>	<u>4</u>

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## TREATMENT SYSTEM WEEKLY INSPECTION CHECKLIST (Continued)

### Well Recovery Information

TAG NO.	DESCRIPTION	DEVICE	UNITS	NORMAL VALUE	OBSERVED CONDITION	COMMENTS
F-1	Pressure across Duplex Filter No. 1	dPSH-19	psi	<20 psi	0	
TK-1	Influent Equalization Tank Level	LIT-9	inches	21.5-45.4	36.42	
P-1	Stripper Feed Pump Discharge Pressure	PI-11	psi	15 psi	12	
	Flow to Air Strippers	FTT-45 Total FTT-46 Total	gpm gallons gpm gallons	80 gpm	67274732 74 75327551 73	
B-1	Blower No. 1 Discharge Pressure	Pressure Gauge	Inches wc	15 to 25	23	
B-2	Blower No. 2 Discharge Pressure	Pressure Gauge	Inches wc	15 to 25	24	
AS-1	Air Stripper No. 1	Trouble Alarm	off		off	
AS-2	Air Stripper No. 2	Trouble Alarm	off		off	
P-2	Transfer Pump Discharge Pressure	PI-17 ABB Drive ABB Drive Motor Temp	PSI Hertz ops time P-2 (on motor)	35 to 58 psi 30 Hrs/Min 50-160°F	40 41.64 43603 90 100	
P-2	Pressure across Duplex Filter No. 2	dPSH-49	psi	<20 psi	10	
AC-1	Carbon Unit No. 1	Pressure Gauge	psi		22	
AC-2	Carbon Unit No. 2	Pressure Gauge	psi		24	
ECT1	Header	Pressure PSI	psi		20	
S-1	Sump	Level	by sight	1/2 full 1/2 full 3/4 full	1/4	



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## TREATMENT SYSTEM - WEEKLY INSPECTION CHECKLIST (Continued)

Rotating Equipment Items:

Tag No.	Description	MAINTENANCE REQUIREMENT	COMPLETED (Yes/No)
P-1	Slurper Feed Pump	Check level of lubricant (change every 1,000 hrs)	Y
P-3	Sump Pump (Hard Switch)	Confirm operation	Y

Filter Bag Changes:

FILTER	BAG CHANGED (Yes/No)	APPEARANCE OF OLD FILTER
F-1	N	
F-2	N	

## COLLECTION SYSTEM - WEEKLY INSPECTION CHECKLIST

ITEM	NORMAL CONDITION	INSPECTED CONDITION	COMMENTS
Injection Wells:			
IW-1	Locked, no leaks, mounding or signs of vandalism	OK	
IW-2	"		
IW-3	"		
IW-4	"		
IW-5	"		
IW-6	"		
IW-7	"		
IW-8	"		
IW-9	"		
IW-10	"		

ITEM	NORMAL CONDITION	INSPECTED CONDITION (Normal or Needs Repair)	COMMENTS Repair Requires (?)
	No abnormal surface water, ponding or soft areas over pipelines	RW-1 Normal	
	"	RW-2	
	"	RW-3	
	"	RW-4	
	"	RW-5	
	"	RW-6	
	"	RW-7	
	"	RW-8	

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**ATTACHMENT F**  
**Photographs Recording Site Conditions**

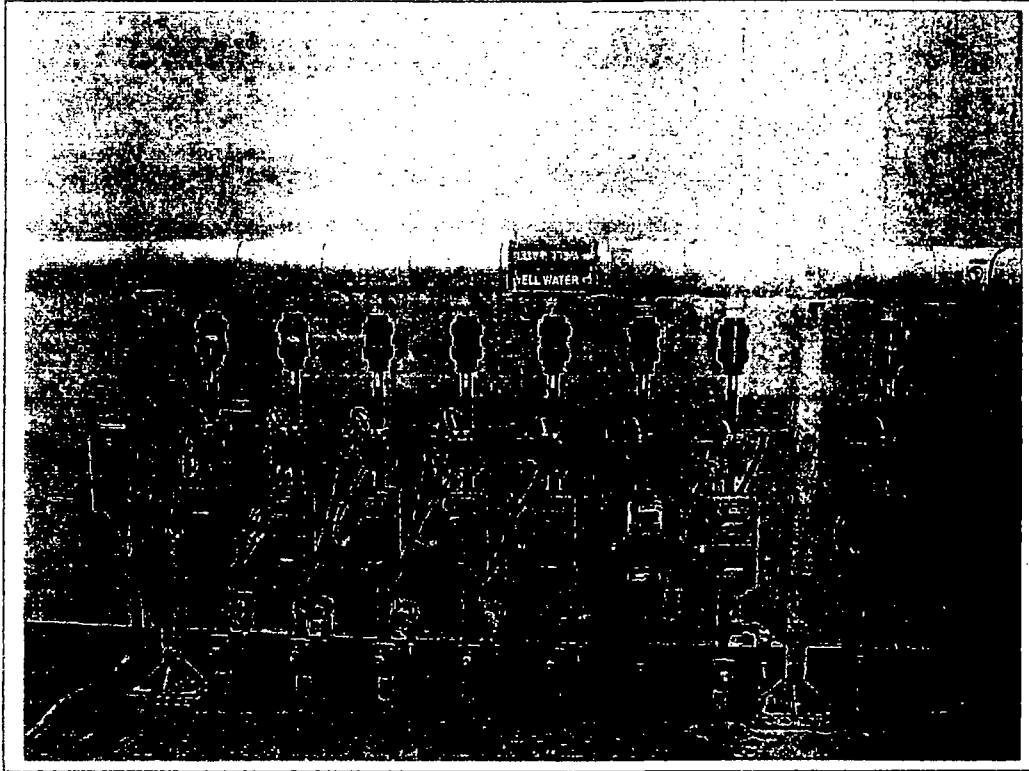


Figure F-1. Influent Header.

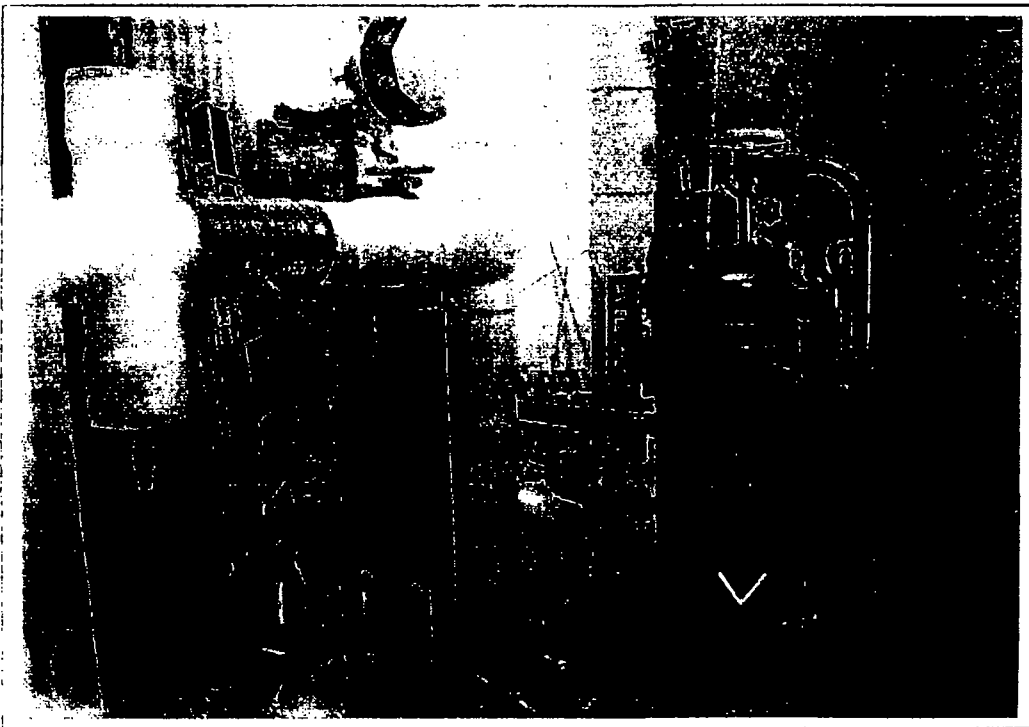


Figure F-2. Bag Filters.

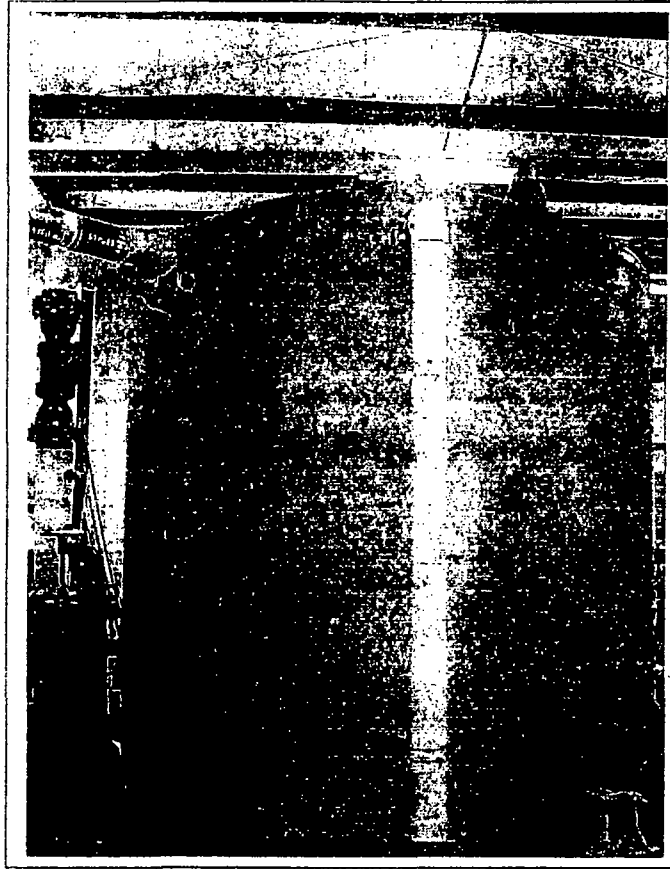


Figure F-3. TK-1 Total Inflow Tank.

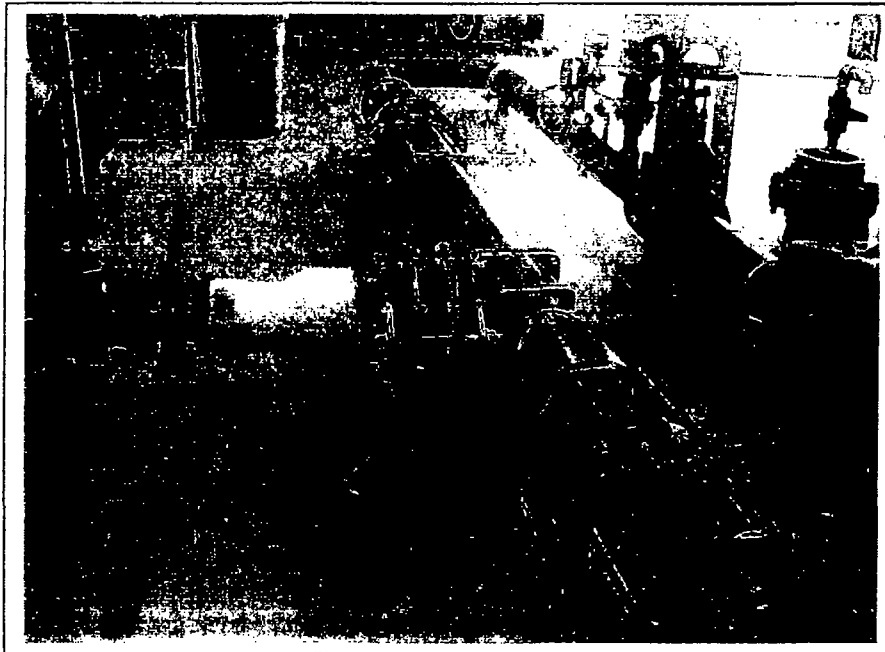


Figure F-4. Pump P-2

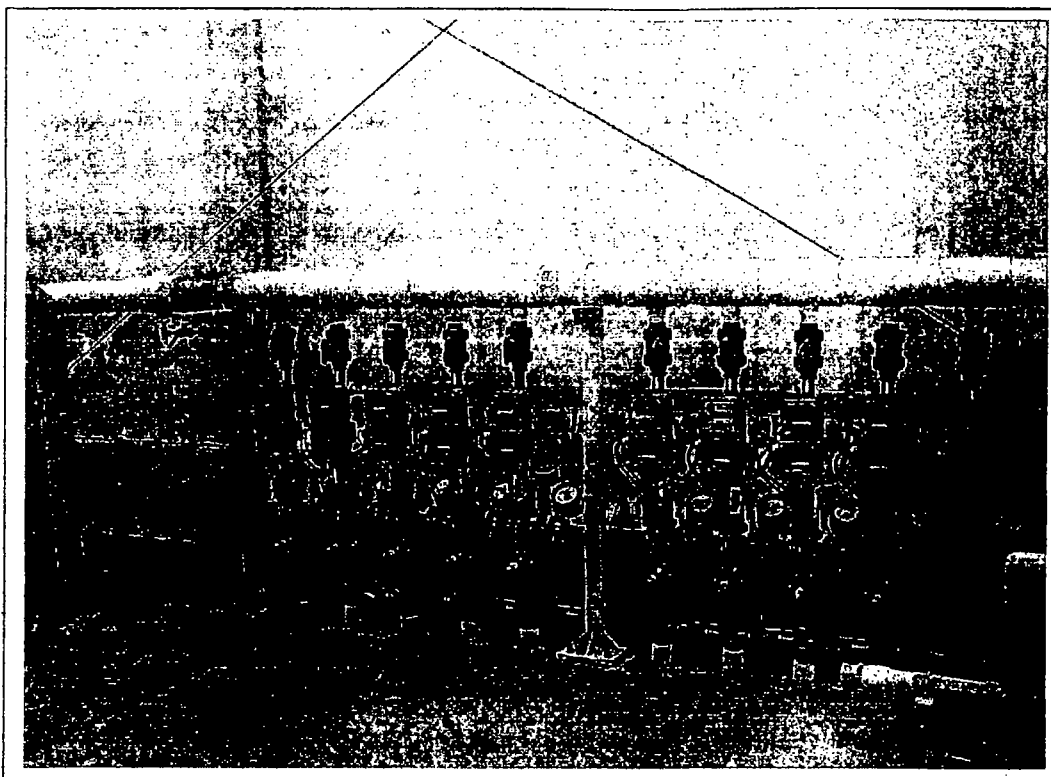


Figure F-5. Effluent (Injection) Header

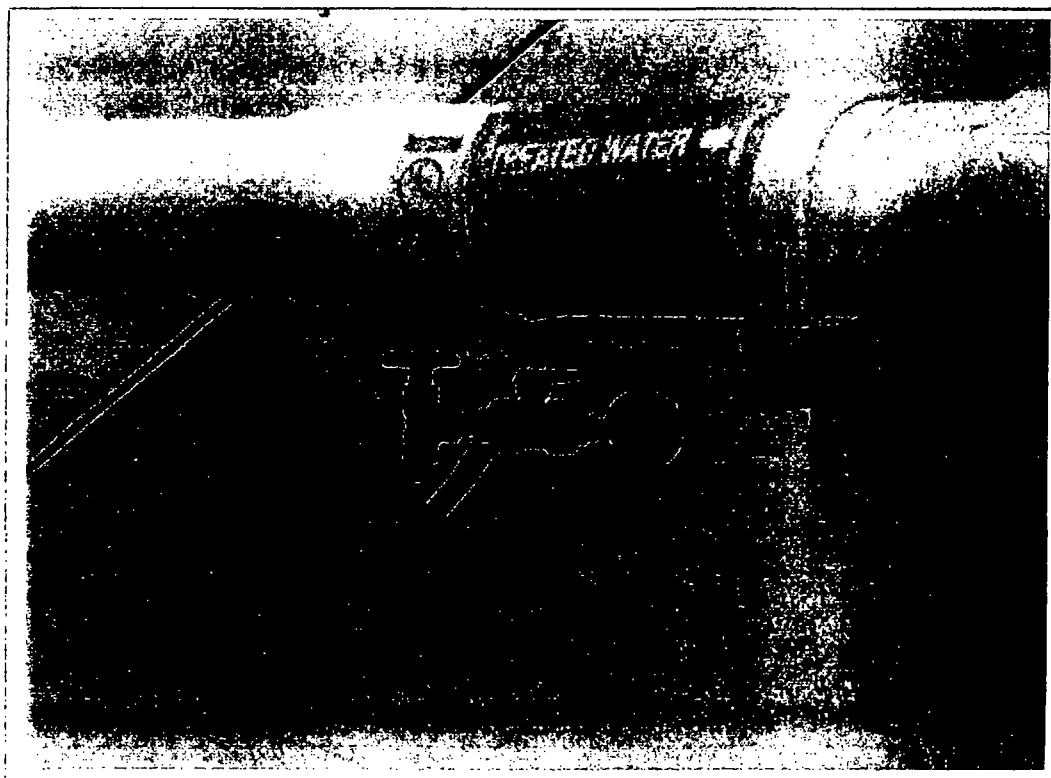


Figure F-6. Total Effluent Sampling Point.



Figure F-7. Groundwater Treatment Facility.

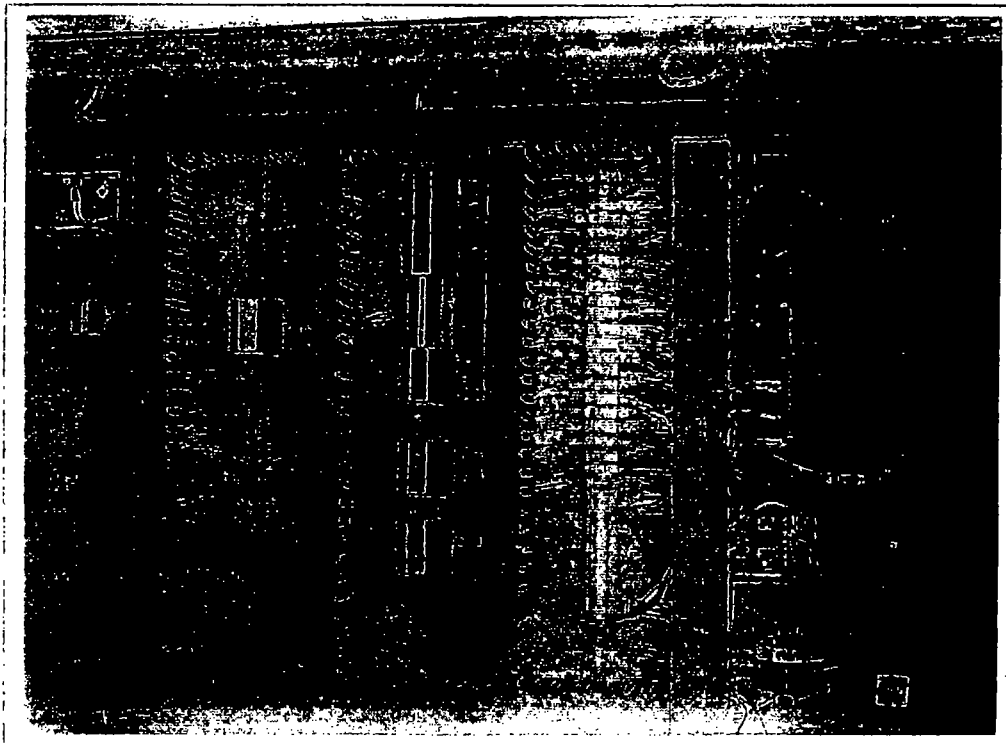


Figure F-8. PLC Panel.

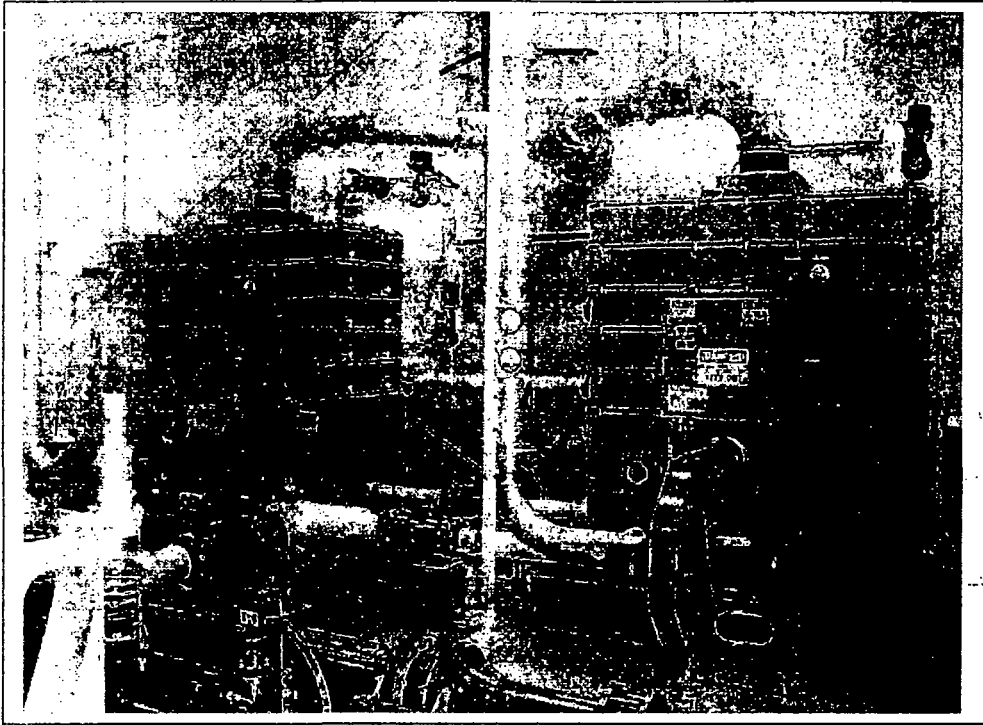


Figure F-9. Air Strippers.



Figure F-10. Extraction Well Control Panel.





Figure F-11. Work Area.



Figure F-12. Work Area.

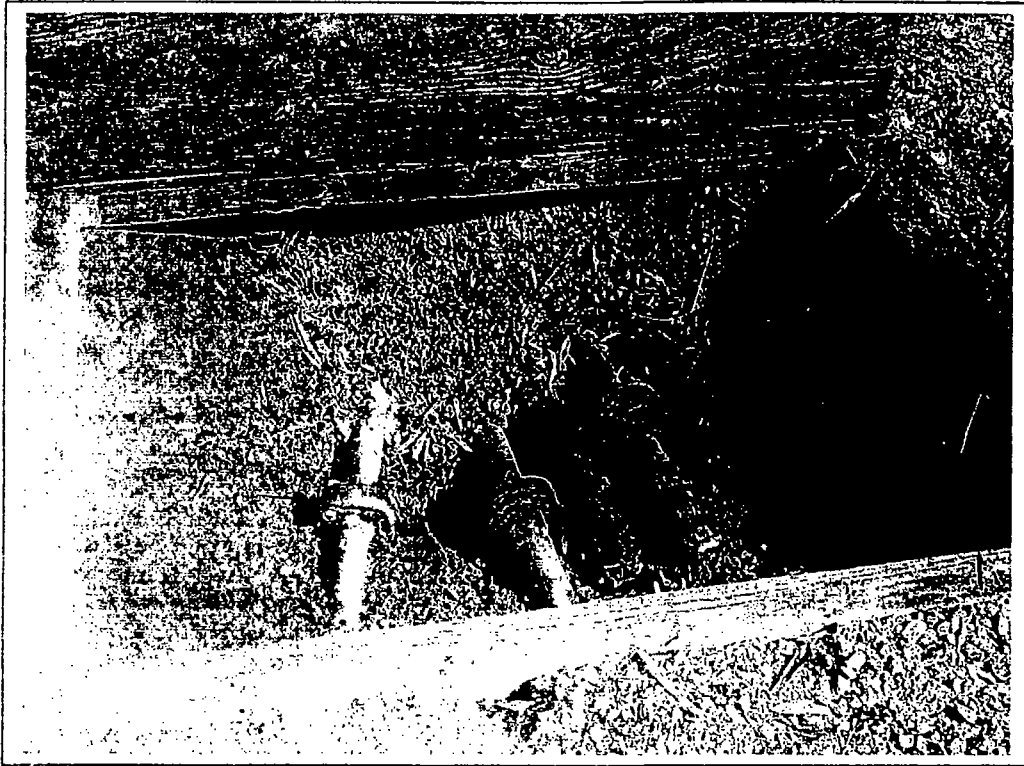


Figure F-13. Pigging Station.

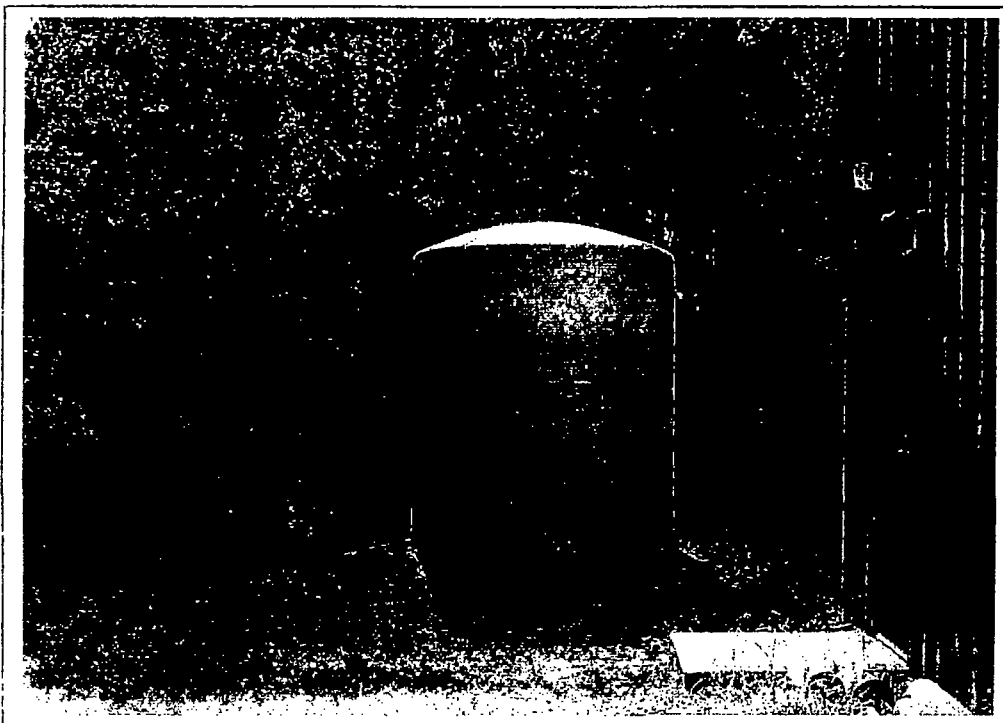


Figure F-14. Receiving Tank for Pigging Operation.

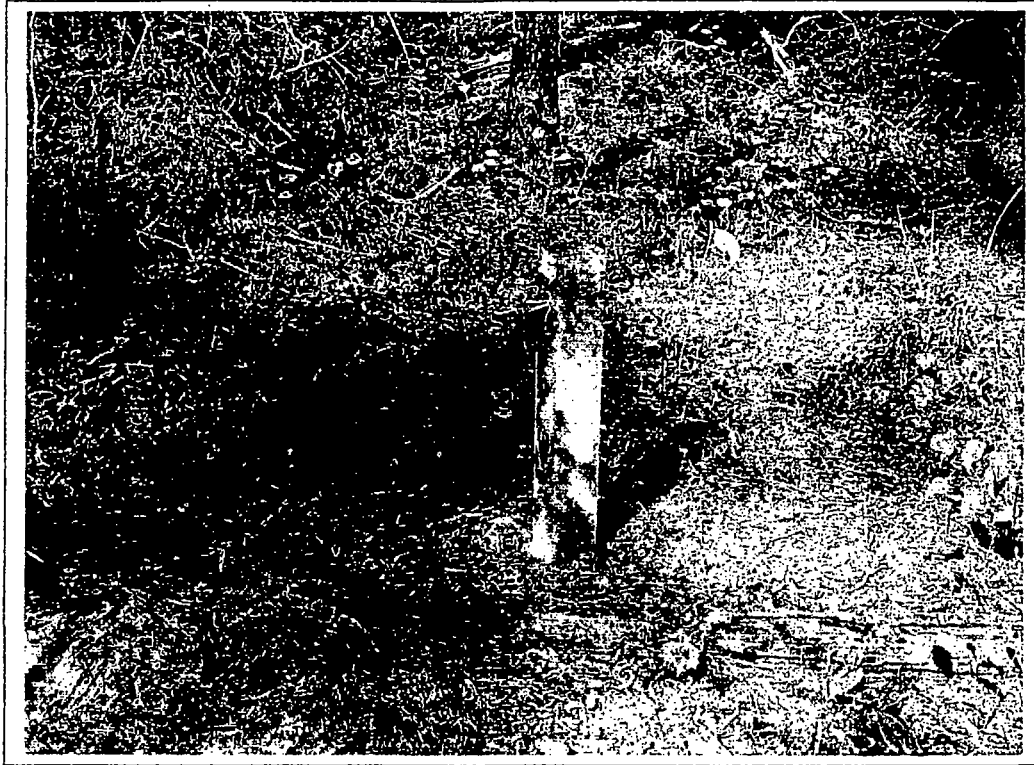


Figure F-15. Sampling Well (Typical).

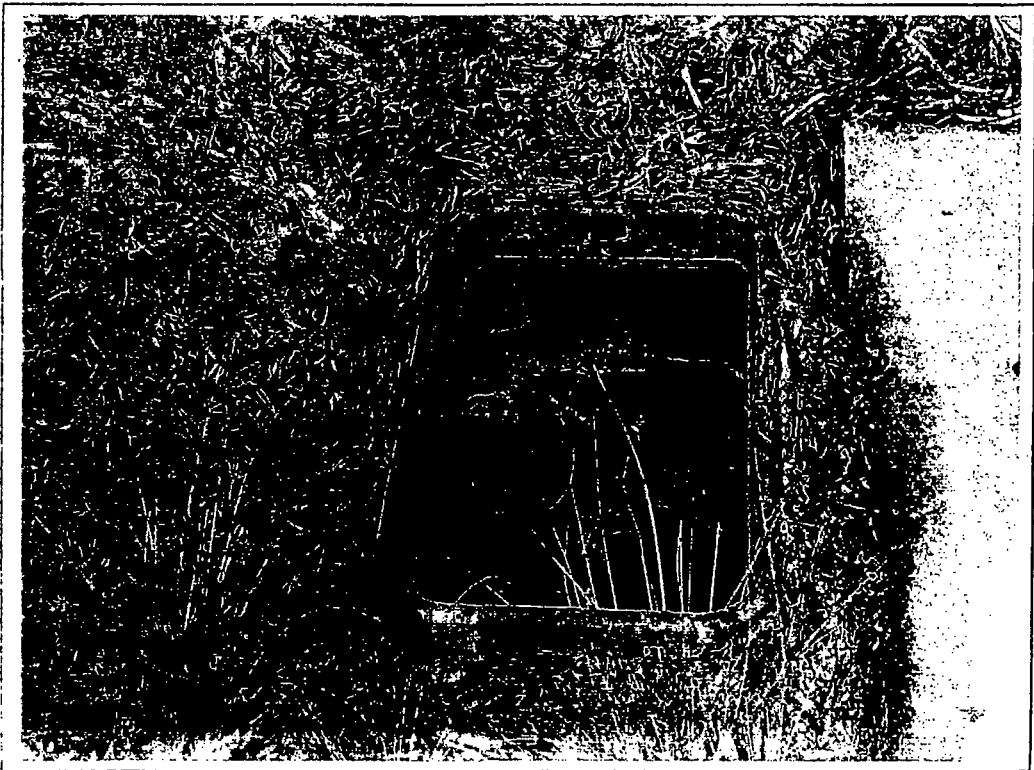


Figure F-16. Pigging Access for RW-2.



Figure F-17. Recovery Well RW-2.

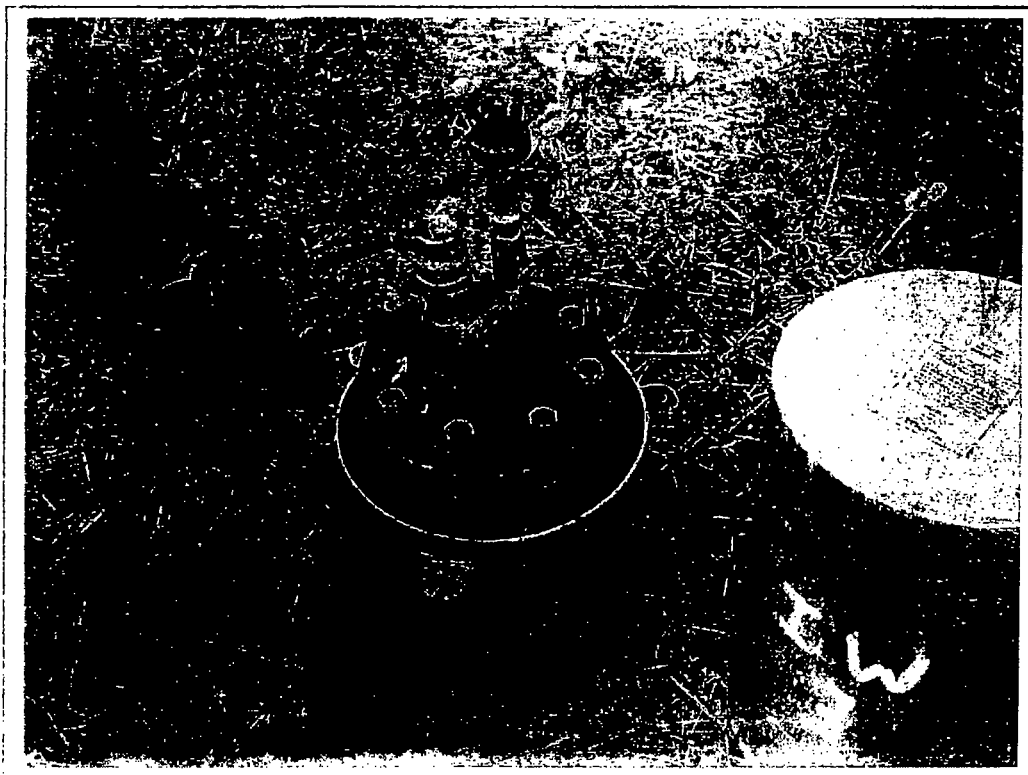


Figure F-18. Injection Well IW-3.

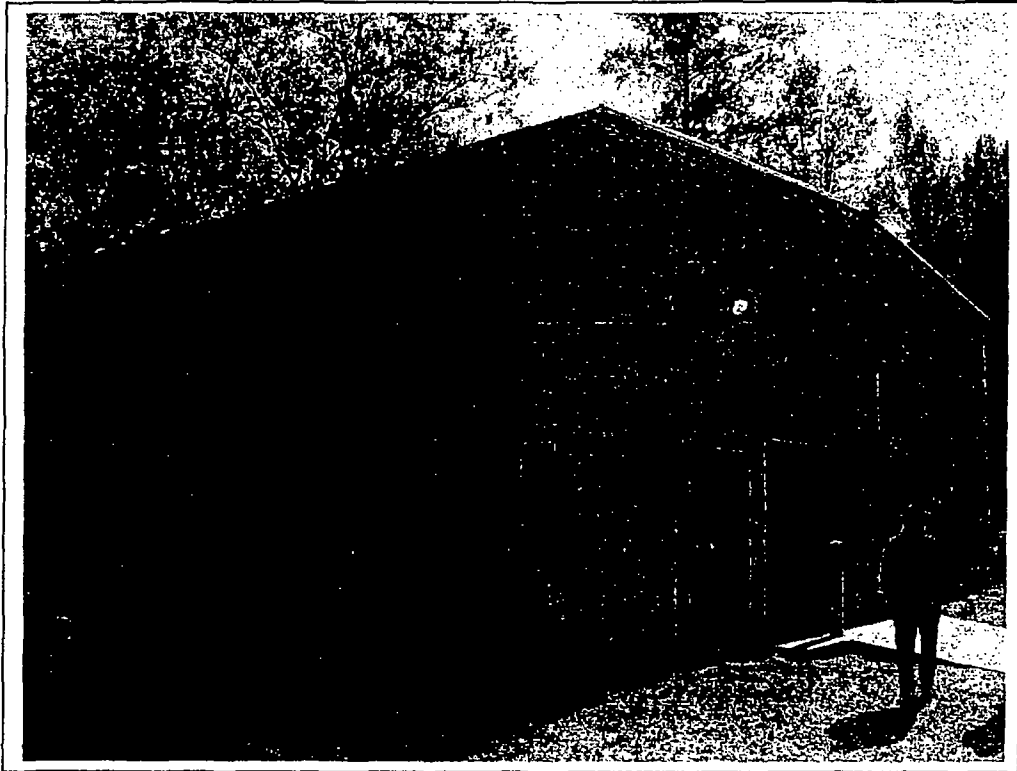


Figure F-19. Groundwater Treatment Facility Building.